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ORIGINAL ARTICLES.

A CONTRIBUTION TO THE STUDY OF THE DIAGNOSIS OF TYPHOID FEVER BY MEANS OF THE BLOOD.

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BY A. HIRST APPEL, A.B., M.D.
CAPTAIN MEDICAL DEPARTMENT U. S. ARMY, AND
FRANK J. THORNBURY, M.D.
LECTURER ON BACTERIOLOGY, UNIVERSITY OF BUFFALO.

In a recent article upon the subject of continued fevers,[1] its distinguished author commenting upon anomalous typhoid, writes "it will lurk and hide its features completely, where it is unsuspected the difficulties attending its clear discernment from certain continued fevers of considerable duration not typhoid, may baffle even the most sagacious physician."

Among the febrile conditions the diagnosis of which may offer at times extreme difficulties of differentiation, he enumerates remittent and relapsing fevers; influenza; the the "ardent fever" of the tropics; "thermic" fever (Guitéras); "asthenic" simple fever (Murchison); "starvation" fever (DaCosta); "Malta" or "rock" fever (Milner); atypical continued fever" (Cain), from a supposed septic agency in the soil; "cypress" fever (probably relapsing fever); the "simple continued fever" described by Baumgarten (doubtful as to its being anomalous typhoid); the prolonged fevers arising in connection with local conditions, as from miliary tubercle, the fever of fecal accumulations, at times closely resembling typhoid; anemic fever; the fever of purpura, especially hemorrhagica; "hysterical" fever, in which the disturbance of heat function may last weeks, months, or even years; the "innominate" fever, described by Goddheart; fevers arising from organic changes—as rapidly advancing arterio-sclerosis; the fever of lithemics; of organic disease, as the endocardium, lung, pleura, duodenum, in which the lesion is slight, masking the etiology; of catarhal pneumonia; of local plastic pleurisies; and the cases of "inexplicable pyrexia" described by Hale White.

Outlining the distinguishing clinical features of these various conditions, and the bacteriologic, microscopic, and chemic examinations of the blood upon which reliance is placed for making the differential diagnosis, no mention is made of the reaction obtained, in cases of true typhoid, with the blood when applied to active cultures of the Eberth bacillus; a test which since 1894, when Pfeiffer first called attention to the subject, has been confirmed in value, and bids fair to become pathognomonic, if this expression can be applied to a test, in the differentiation of these obscure febrile conditions from true typhoid.

The antagonism existing between the typhoid bacillus and blood in which an antitoxin has been developed by the presence of its products, has been known since 1888, when Chantemesse and Widal demonstrated that certain animals could be rendered immune against the typhoid bacillus, by the subcutaneous injection of sterilized cultures of this organism.

In 1892, Bitter concluded that immunity, which he induced in rabbits in the same manner, was due to the presence in the animal of "antitoxin."

Bruschettini in the same year, following the same line of research, noted that the blood serum of animals immunized by cultures sterilized at 60 degrees C., possessed antitoxic properties, and had far greater germicidal potency over the typhoid bacillus than the blood of the normal rabbit. Stern (1892) observed that the blood of a man who had suffered an attack of typhoid fever 17½ years previously, showed unusual bactericidal power over the bacillus of Eberth; and Chantemesse and Widal arrived at the conclusion that "in general the guinea pig is immunized against the action of virulent typhoid cultures by the subcutaneous injection of a small quantity of the serum of persons who have suffered an attack of typhoid fever, no matter how remote." The fact of the existence of antitoxin in the blood of patients who are or have been victims of typhoid, and of its presence also in the blood of immunized animals has been utilized successfully, experimentally, in animal therapy and more recently to some extent in man.[2] The serum of the blood from a fatal case of typhoid was found by Stern to be still more potent in animal as a therapeutic agent, than that of recent convalescents.

In 1894 the discovery was made by Richard Pfeiffer of Berlin that the specific poison of the bacillus of Eberth is not present in the filtered culture but is closely associated and remains with the bacterial cells. The bacilli may be killed by a temperature of 56 C. without injury to this toxic substance. By the latter, then, animals may be immunized and their blood be found to contain an antitoxin *which has a specific bactericidal action upon the typhoid bacillus.* Pfeiffer also clearly established the presence of this antitoxin

[1] DaCosta: Am. Journal Medical Sciences, June, 1896.

[2] Pfeiffer and Kolle, (Deutsche Medicinishe Wochenschrift, Nov. 16 p. 6), publish results obtained upon the human subject by injection, into the subcutaneous tissue of the back, of bouillon cultures of typhoid bacilli, sterilized at 56 degrees C.

Healthy persons having no previous history of typhoid fever, experienced malaise, chills, giddiness and pain at sight of puncture, usually two or three hours after injection, with evening temperature upon the first day of about 101.3 F. which soon fell to the normal. They find that one injection of culture brings about the specific change in the blood which causes agglutination and immobility of the typhoid bacilli in pure cultures, recognizable in about six days, and exercised in as great a degree as they have ever been able to observe in convalescents from typhoid.

By mixing serum thus obtained with unsterilized bouillon cultures and injecting the mixture intraperitoneally, they find that guinea-pigs, although succumbing to the unsterilized cultures alone, will survive inoculation with the mixture, and tabulated the quantities of dead culture thus required to secure immunity.

Injection of dead cultures in man resulting in the production of substances in the blood serum inhibiting the specific bacteria, they hope thus to secure immunity by prophylactic inoculations, analogous to the results of Haffkine's protective inoculations against cholera, now substantiated by many thousands of cases. Should further observations confirm that they can confer the same immunity as exists in persons having had the disease, the procedure will become one of the greatest practical value, especially "in the face of epidemics or in war, since whole armies having been at times decimated by this scourge."

in the blood of patients who had recently suffered an attack of typhoid, and in the same year demonstrated its peculiar action upon the Eberth bacillus. Undoubtedly however, to Widal of Paris is due the credit of first utilizing this knowledge in every-day practical clinical work. Instead of obtaining the serum from the vein of a patient's arm, by means of a sterilized syringe, decanting after separation, the technique originally employed, he found that the dried blood or serum would give the result as published by him in the *Bulletin Médical* of August 12, 1896.

On Sept. 17, 1896, Wyatt Johnston of Montreal, observing the same fact, read a paper before the American Public Health Association, advocating the use of dried blood, as better adapted for bringing this test within the range of ordinary public-health laboratory work, and "enabling it to be dealt with in a wholesale manner." The latter method makes the discovery easy of application, and gives it the practical importance it now possesses. A drop or two of blood dried upon a slip of paper or cover glass (absolute sterilization is not essential), can be transmitted long distances with ease and safety, and is sufficient, in most cases, to determine the presence or absence of the disease.

To obtain the reaction it is simply necessary to dissolve the drop in sterile water and transferring it to a cover slip, inoculate with the pure culture and examine. If the case is one of typhoid fever, the reaction becomes manifest within a few minutes.

The following scale, formulated by Widal, enables the stating in terms of more or less exactness the measure of agglutinating power of any given specimen, indicating the strength of the antitoxin in the serum examined, and may be useful in doubtful cases.

Taking a series of sterile tubes containing respectively 1, 2, 3, 4, and 5 c.c. of bouillon, he added to each a drop of the serum to be examined; inoculates with a trace of culture, and examines in from twelve to twenty-four hours. If, for example, the tube containing 3 c.c. of bouillon, gives a typical reaction, while that which contains 4 c.c. does not, the agglutinating power of the fluid studied is exercised between 1 to 60 and 1 to 80; in a typhoid case the agglutinating power of the serum varies generally between 1 to 60 and 1 to 80; it could reach 1 to 100, rarely passing this limit; where it reaches 1 to 80 or 1 to 100 we find the reaction always takes place immediately. Let the specimen be prepared ever so quickly and examined as soon as it can be placed under the microscope, beginning of the clumping process of the bacilli will have already taken place. In the very early stages of the disease we found the reaction less pronounced at first, but gradually increasing in intensity, although even late a few bacilli may still retain some motion. These evidently were not acted upon by the agglutinating substance, which apparently had exhausted its energy upon the organisms already aggregated into clumps. Its action here presents some simularity to the chemic process of disinfection, which results in the production of a third substance through *contact* of the bactericidal agent with the cells. But that the process of agglutination is probably not a chemic change in the composition of the bacteria, but rather a sort of catalytic action, is proven by inoculating suitable media with the bacteria which had been agglutinated and rendered immotile by typhoid serum. Strangely enough, they grew with apparently the same vigor as the original cultures, their progeny recover their independence and active motion and the new growths again respond to the typhoid reaction.[3]

The blood retains its agglutinating power with great tenacity. In dried specimens reëxamined after two or three months we found it undimished, although no particular care was taken to guard against contamination. A number of specimens sent us for examination from a distance, were collected without aseptic precaution upon ordinary writing paper and transmitted by mail. The method employed did not appear to affect the result, typhoid cases promptly giving the reaction, thus indicating that unusual precaution in the collection of specimens to be examined may be quite unnecessary. Dried blood is slow to undergo putrefactive changes, the saphrophytes responsible for such changes needing moisture for their proliferation.

That the agglutinating property be exhibited it is not necessary that the culture be living and active; dead bacilli are likewise massed into clumps by the serum. After exposing a pure culture of Eberth's bacillus to 60 C. for half an hour (the thermal death point being 56 degrees) they were still found to agglutinate. Further illustrating the tenacity with which the antitoxic power is retained in Stern's case, cited above, showing unusual bactericidal power in the blood of a man who had suffered an attack of typhoid fever seventeen and a half years previously, and Widal's reported case, which gave the reaction after seven years, we were successful in obtaining a decided reaction in a case thirty-one years after recovery,[4] and other cases examined after one, two, eight and ten years, gave the reaction with virulent cultures. We have also found, as stated by Dieulafoy, that the agglutinative power is by no means confined to blood serum, but is found in other fluids of the economy. The reaction appears, exceptionally, in the *urine* of typhoid cases. It is constantly found in the serum of *vesication*. Widal and Sicard found it in the pericardial, peritoneal and pleural serum in three cases, post-mortem. A marked reaction can be obtained from the *milk* of nursing women affected with typhoid; likewise from the milk or the colostrum of rabbits and the milk of goats inoculated with Eberth's bacillus.[5]

The serum of *edematous infiltration* in typhoid cases agglutinates powerfully. In a case of grave typhoid recently reported (Etienne), which provoked abortion in a pregnant woman, the blood of the patient agglutinated typically, but that of the fetus was negative. In rabbits, however, inoculated by Widal and Sicard six hours before, the fetal blood agglutinated from birth, although less powerfully than in the mother, proving that the agglutinating substance passed into the fetal circulation. The reaction can be obtained from the human biliary secretion. Negative results were obtained from the cerebro-spinal fluid and that of the vesiculæ seminales. Negative results were obtained from the saliva, but Achard and Bensaude have demonstrated the reaction where the submaxillary or parotid secretions were collected within the gland ducts. The *aqueous humor* and the secretion from the *lachrymal gland* will also in typhoid

[3] It may be possible, however, that these cultures result from a few cells which, enclosed in the mass, escaped the action of the agglutinating agent. [We found also that the bacilli, after agglutination, stain readily with the anilin colors. Where doubt exists, fibrin particles may thus be easily differentiated from masses of bacilli.]

[4] In a physician who happened into the laboratory while we were examining blood specimens.

[5] Journal Académie de Médecine, Sept. 26, 1896.

cases give the reaction of agglutination. The tears constitute a secretion always easy to obtain. The fact that they give the reaction is important. From the internal angle of the eye, with a fine pipette, a drop sufficient for an extemporaneous examination can always be aspirated. A distinction is made by the French observers between the secretion naturally present and that provoked artificially, as by ammonia or menthol. They find in the latter case the reaction often fails. Examining in both ways cases giving the blood reaction typically, our results confirm the observations of Widal and Sicard, who found the reaction in the tears of ten out of fourteen cases examined with the natural secretion, but when provoked artificially it persisted to a slight degree in but three. In two immunized rabbits the reaction appeared typically in a mixture of two drops of secretion to ten of culture. The lachrymal secretion of persons never having had typhoid, and of normal rabbits, was negative. In immunized rabbits the aqueous humor gave the reaction in seven out of nine cases. In normal rabbits the aqueous was negative.[6]

From these results, showing the agglutinating property in the tears, the aqueous and the serum of edema the conclusion is reached that the leucocytes play no part in the secretion of the agglutinating substance. Duclaux has shown that the greater part of the casein of milk is separated from the filtrate, after passing through a Chamberland filter. Achard and Bensaude demonstrated that milk thus filtered, in parting with this albuminoid, loses its power of agglutination previously possessed. In blood serum thus filtered the power is also greatly diminished. In fluids poor in albuminoids (as the cerebro-spinal and saliva) the reaction fails. The inference is therefore logical that for the production of the agglutinating reaction the albuminoids are essential.

The albuminoids existing in the blood include serum-albumin, serum-globulin and fibrinogen, the latter existing in the circulating serum, but in the act of coagulation under the influence of the fibrin-ferment, separating into fibrin (which forms the clot), a globulin and probably other substances. To separate the serum-albumin from the serum-globulin, they add magnesium sulphate to saturation to a tube of typhoid serum. The globulin is precipitated and separated by filtration. Mixing now two or three drops of the filtrate deprived of globulin to ten drops of culture, it is found that the bacilli retain their independence and motility. The serum deprived of its globulin seems to have lost its agglutinating property. The globulin remaining upon the filter, from which possible remaining traces of serum-albumin is removed by again washing the precipitate with a concentrated solution of magnesium sulphate until the filtrate will no longer coagulate by heat, mixed with an equal part of distilled water is found to possess the agglutinating property in a high degree. The phenomenon is still further intensified if less water is added, showing thus that the agglutinating property is definitely associated with the globulin.

Arthus and Pagès, in order to study the fibrinogen as it exists in the blood, prevented coagulation by adding potassium oxalate, about 1.5 to 1,000, to the blood as it issued from the vessels. In the plasma thus obtained the fibrinogen is retained. To precipitate this they add 15 parts to 100 by weight of sodium chlorid, dissolving the precipitate in distilled water. The solution of fibrinogen thus derived from typhoid blood agglutinated the bacilli. Treating now the plasma, deprived of its fibrinogen, with a saturated solution of magnesium sulphate and filtering they obtained the same result as in the serum of coagulated blood; the filtrate containing the albumin had lost its agglutinating power which was retained by the globulin remaining upon the filter.

The other body fluids experimented upon, the serum of blisters, of the peritoneum, of the pericardium and of edema in typhoid cases, react in the same manner as the blood plasma. Fibrinogen and globulin apparently possess the agglutinating property.

Dieulafoy, Widal and Sicard have made an analysis also of the milk, which contains an albuminoid not found in solution in the blood. A goat inoculated with typhoid furnished, seven days afterward, milk possessed of a high degree of agglutinating power. By adding an excess of magnesia sulphate, the casein and lacto-globulin are precipitated together with the fat globules. The filtrate containing but the albuminoid lactalbumin, shows but slight agglutinating capacity. Adding a solution of sodium chlorid to saturation, the casein is precipitated with the fat globules, while the lacto-globulin remains in solution in the liquid with the lactalbumin. The filtrate gives the reaction typically, even though the whole milk is but feebly agglutinative. The phenomenon could not be due but to the presence of the lacto-globulin, for, on now adding magnesium sulphate to saturation the power of agglutination in the filtrate disappeared entirely. By coagulating the milk with rennet, the lacto-serum obtained was powerfully agglutinative, which property again disappeared upon precipitation with magnesium sulphate to saturation. To determine the presence of this property in the casein they now add to the milk acetic acid in the proportion of 1 to 2 parts per 1,000, to precipitate the casein, washing with water to get rid of the acid and of traces of lacto-globulin. Dissolving the precipitate, after filtration, in sodium hydrate, 1 to 100, they found that the solution, containing no other albuminoid but the casein, strongly agglutinated the bacilli. It is thus shown that the albuminoids contained in the *blood* of typhoids do not alone possess the power of agglutination, but that casein and without doubt other albuminoids can also acquire it, imparting this power to their solutions and regaining it upon precipitation.

The practical bearing of these experiments lies in the fact that the whole blood, containing *all* the albuminoid elements, instead of being less sensitive to the typhoid reactions, as Widal and others first supposed, is in fact *more* so than the serum alone; we therefore obtain incomplete or pseudo-reactions from typhoids years after recovery and perhaps other conditions from solutions of the whole blood, fluid or dried, which are not observed when the serum alone is used, and which may be misleading; the agglutination observed being at times equal to that of true typhoid fever in the active stage of the disease. In these cases, however, there is not observed the same progressive loss of motion that is found in true typhoid, and herein lies the differentiation; more stress must be laid upon the *loss of motility* of the bacilli than upon their clumping. In fact, in pseudo cases the latter is sometimes more complete and often more quickly exhibited than in true typhoid. Where doubt still exists, the differentiation is more readily accomplished after

[6] Ibid. The chemic analyses and experiments upon the fluids of the body are translated from Widal and Sicard's paper quoted.

twenty-four hours, the specimen being meanwhile kept at blood temperature.

While the clumping for the most part persists there are at the same time numbers of individual bacilli in the clear spaces that retain their active motion, this activity being much greater than we find in true typhoid cases. Their number also increases upon longer exposure, thus definitely making the distinction from typhoid blood. Clumps once formed we have never seen break up again in true typhoid; the reverse often happens in pseudo-reactions. There still remains, however, a number of cases, especially where the history shows previous typhoid, in which the agglutination and loss of motion is so marked and so closely resembles the reaction of typhoid in its active febrile stage, that errors in diagnosis might still readily be made when dried blood is tested with virulent cultures of the bacilli.

As already stated, pseudo-reactions are rare with the serum alone separated from the clot. But when *all* the albuminoids are present, as in the dried blood, the agglutinative property, intensified, is readily excited when brought in contact with a very virulent culture, even where there are no present symptoms of the disease.

The "quantitative" test, under such circumstances, affords a valuable means of guarding against error. By diluting, with sterile water, the specimen to be examined, a point is reached where the reaction becomes negative; but where a control specimen from an undoubted typhoid case, with equal dilution, still gives a typical reaction.[7]

Still more reliable conclusions may be obtained by discarding entirely the very virulent culture, using instead one the virulence of which has not been increased by successive seedings, but instead is transplanted from a month-old growth upon agar into bouillon and incubated twelve to twenty-four hours before use.[8] Thus grown, the bacilli are still measurably active, but their rapid, darting motion is absent; they exhibit but gliding, serpentine movements across the field.

Reëxamining with the culture thus obtained blood specimens in which agglutination occurred with virulent cultures, we were able to completely eliminate the troublesome pseudo-reactions, and by this technic therefore obviate much of the confusion and error resulting from the examination by the dried blood method. The conclusion seems indicated, that given a case of acute pyrexia of some duration, in which the blood gives the reaction of agglutination with a culture thus prepared, *and where there is corresponding loss of motility in addition to the clumping*, we may safely decide that we are dealing with a case of typhoid fever.

Where active motion persists with clumping, the specimen must be kept at blood temperature for twenty-four hours. In typhoid cases the reaction is *progressive*, clumps once formed do not again separate; immotility becomes more complete and the clear spaces between the clumps of bacilli more defined. The reverse obtains in pseudo-reactions, when, after twenty-four or forty-eight hours, the hanging drop may perhaps be swarming with active bacilli.

In dried blood specimens from fifty cases examined, in nearly all of which the clinical symptoms were more or less typical and sufficient to make the diagnosis of typhoid fever, we were able to obtain the reaction upon cultures thus attenuated, even when the blood was diluted until the color was scarcely discernible; while in cases, as above noted, in which we had obtained the reaction with *virulent* cultures from blood in health a number of years after recovery, the reaction, under the same conditions, was constantly negative.

Another point of distinction may often be found in the *time* required for agglutination to take place, it often occurring in pseudo-reactions *more quickly* than in typhoid. The rapidly formed, oscillating, swaying masses of bacilli are not, as a rule, the effect of typhoid blood. With the latter, more often, especially with largely diluted blood, the *motion* is first arrested, clumps not forming until later.

To determine the differential *character* of the reaction we made a large number of comparative examinations of the action of typhoid blood upon other motile organisms, especially of those closely allied to Eberth's bacillus in morphologic and biologic characteristics. Of these the "colon" bacillus is the most important, closely resembling Eberth's bacillus, always associated with the latter in typhoid discharges, and believed by many observers to be one and the same organism, an evolution from saprophytic existence to pathogenic potency taking place in cases of typhoid fever. In the operative procedures recently successfully undertaken for suture of perforations of ulcerated intestine in this disease, it is remarkable that the "colon" and not Eberth's bacillus was found upon bacteriologic examinations of the scrapings of the ulcerated surfaces.

Both the typhoid and the colon bacillus vary considerably as a result of conditions relating to their environment, and it is difficult to determine whether certain bacilli of this group, sometimes found in river water, etc., are to be regarded as varieties of one or the other species mentioned, or as distinct species. Cesaris-Demel and Orlandi concluded (1894) that animals immunized against the "colon" bacillus furnish a serum which has protective and therapeutic value against infection by the typhoid bacillus, and the reverse.[9]

But in regard to their response, in artificial cultures at least, to typhoid serum, they differ widely. No matter how powerfully and quickly the serum used agglutinated the bacillus of Eberth, we were never able to observe the least effect upon the "colon."

Among other motile organisms tested in pure culture, the behavior of the B. pyocyanus with typhoid serum is also of interest. It is but recently that the use of sterilized cultures of this bacillus was tested in the treatment of typhoid fever—it having been shown by experiments upon animals that sterilized cultures of pyocyanus exercised an immunizing influence against typhoid infection, similar to its known antagonism to the bacillus of anthrax. The results we obtained in a measure confirmed these observations, although Kraus and Buswell concluded from their observations in twelve cases treated with sterilized pyocyanus cultures, that this method of treatment "has no specific curative value." By inoculating guinea-pigs with pyocyanus we secured a serum from the abdominal cavity containing the bacilli in large numbers. Active typhoid serum had a slight agglutinating effect upon these bacilli, rather more in the serum thus obtained than in artificial culture. When,

[7] Widal; Greenbaum.
[8] Report Board of Health Province of Quebec, Johnston and McTaggart, Jan. 7, 1897.
[9] Sternberg: Immunity and Serum Therapy, 1895.

however, the blood serum from the same guinea-pig (a control containing no bacilli), or the diluted dried blood, was inoculated with a virulent bouillon culture of Eberth's bacillus, the latter were quickly agglutinated and immobilized as by typhoid blood serum; showing, as well as by their immunizing influence, that an undoubted antagonism exists between these organisms. The normal blood serum of the guinea-pig gave negative results.

The effect of the typhoid serum upon a number of other motile bacteria found in water, the B. fluorescens, Indicus, subtilis, violaceus, etc., in each case was negative. They continued their motion as freely and independently in the serum as in their normal habitat.

Little or no antitoxic effect could be observed upon the pathogenic organisms causing, like typhoid, notable intestinal lesions, as the spirilla of Asiatic cholera (which are agglutinated promptly by cholera serum), or of Metchnikoff or of Finkler-Prior, or upon the bacillus of hog cholera, closely resembling the "colon" bacillus morphologically.

The essential etiologic organisms of malignant edema and tetanus also retained their separate existence and motility in the serum.

Excepting, then, the reaction with virulent culture of the B. pyocyanus, we were unable to find that other motile organisms, saprophytic or pathogenic, were at all affected by typhoid blood.

Regarding the action of blood from pathologic conditions other than typhoid upon the Eberth bacillus, it has not been possible for us to compare the result of blood examination in many of the obscure forms of continued fevers above desrcibed, which often offer such great difficulty in diagnosis. From such affections, however, as we have been able to examine, fairly definite conclusions were obtained.

In addition to the fifty cases of more or less typical typhoid, our conclusions are based upon the study of about twenty-five cases in which the clinical symptoms were more or less doubtful and suggestive of typhoid, of miscellaneous affections, and of many specimens of normal blood of man and the lower animals.

The examinations made included blood from acute and chronic rheumatism, gout, aseptic (surgical) fever, mumps, malarial fevers (intermittent and remittent), influenza, cystitis, acute bronchitis, acute enteritis, catarrhal pneumonia, appendicitis, acute pericarditis, syphilis, etc.

At times we obtained from apparently normal blood, and from that of miscellaneous affections in which there was no suspicion of typhoid fever, an unmistakable reaction, resembling that of typhoid blood; confirming the experience of Stern (1894), who concluded therefrom that a protective influence was exercised, in some cases, upon animals, with blood from individuals who had never suffered from typhoid fever, although larger doses were required. He suggested that this antitoxic power is possibly due to mild or unrecognized previous infection.

The agglutinating effect has been found in diabetes. The normal placental serum is said to possess marked destructive power for the B. typhosus.[10]

The presence of the reaction in such cases may occasion errors in the diagnosis, which must be guarded against. In a case of influenza, with nervous symptoms, headache, prostration, fever, bronchitis, we found a decided reaction with a virulent culture. It was learned that the patient had had an attack of "typho-malarial" fever some eight years before. We established the diagnosis of influenza in this case by culture test, isolating the influenza bacillus from the blood, cultivating it in nutrient agar and examining in stained preparation.

Such difficulty is not confined to the blood of the human subject. In testing the blood of an apparently normal rabbit, not immunized, we were astonished to find that it possessed a high degree of agglutinating power upon the bacilli of virulent cultures, resembling in every respect that of typhoid serum. To determine whether this property was a normal attribute of rabbit's blood generally, we tested in ten other rabbits, but with negative results.

The blood of the horse, as stated by Bordet, often produces a clumping and granular appearance in typhoid culture, not distinguishable from typhoid blood except that it produces a similar agglutinative effect upon the "colon" bacilli, which typhoid does not.[11]

We observed also, in testing hen's blood, that one specimen (of a number examined) produced marked effect upon the typhoid bacilli, agglutinating them in the same manner as typhoid serum.

We could not find it in the blood of other animals, that of the ox, sheep, calf, deer, dog, cat, pig, guinea-pig, mouse, pigeon, all acting in the manner of normal blood. Rabbit No. 1 was repeatedly examined, a number of specimens taken upon several different days, with a like result.

What causes the phenomenon in these particular animals? Although the numerous attempts to communicate typhoid fever to the lower animals have given a negative result in every instance, so far as producing the characteristic lesions as found in man, the fact is well established that Eberth's bacillus will multiply abundantly in many of them, and can be obtained from the spleen exactly as in the human subject, and that although infection is often fatal, a large proportion survive artificial inoculation.

A reasonable hypothesis might thus be drawn to account for the occurrence of typhoid fever in previously uninhabited districts, upon the prairies or in the depths of the woods, where the source of the infection can not be traced to human importation.

Descazals[12] reports an epidemic of "psittacose," a disease which Peter characterized as "typhus of parrots," recording the cases of forty-seven persons affected, with fifteen deaths. The disease is traced to the importation of parrots. An infected individual seems capable of transmitting the infection to others. The infection closely resembles typhoid, but the onset is often marked by local manifestations about the mouth.

But from whatever other cause this agglutinating substance may be present in the albuminoids of the blood, whether in lower animals or in man, the effect upon the typhoid bacilli may be distinguished from that obtained from typhoid fever blood. Upon dilution of the specimen examined, discarding the virulent for attenuated cultures, the bacilli in the latter will still become typically agglutinated with typhoid fever blood when diluted to a degree in which the pseudo-reactions entirely disappear.

Regarding the possibility of obtaining the diagnos-

[10] Flexnor: Jour. Exp. Med., July, 1896.

[11] W. H. Jamieson: Brit. Med. Journal.

[12] Gazette des Hôpitaux, No. 111.

tic reaction in the early stages of typhoid, Case No. 16 of our series warrants especial attention from the fact that it was elicited upon the third day of the fever. A copy of the temperature chart, in this case received by mail from the neighboring city of Rochester, with the specimen of blood, we pass around for your inspection. The subsequent clinical history of this case confirmed the diagnosis. If further experience proves the practicability of recognizing the disease thus early, the value of the test, especially in justifying prompt adoption of precautions for the prevention of furture infection, will be very great.

Five of the specimens of blood examined elicited from us a report contradictory to the clinical diagnosis. To these cases great interest also attaches—as their subsequent histories all tended to confirm the bacteriologic rather than the clinical diagnosis.

In Case No. 22 of our series the blood examination was made upon the fifth day after admission to the hospital.

The temperature record in this case; the signficant clinical symptoms: Enlarged spleen (common, however, in many conditions in children), diarrhea, semi-stupor for several days; some doubtful rose-colored spots upon the abdomen, and finally, the fact that the child was taken from a typhoid-fever infected house (a sister occupying the adjoining bed in the hospital with a typical attack); certainly strongly suggested the clinical diagnosis of typhoid fever, which in fact had been made.

But note the result of the blood examination: The reaction was entirely negative, while that of the sister was prompt and decided. An opinion in accordance with this examination was therefore given. Naturally, the further progress of these two cases was watched with the greatest interest, and the hospital records, which we here also present, can be fairly assumed to be confirmatory evidence of the reliability of the test; the temperature of the boy falling to 99 degrees two days afterward, and not going above this again during the remainder of his stay in the hospital—some ten days.

In Case No. 34 of our series, the "typhoid state," was especially marked; dry fissured tongue covered with a brownish-black fur, sordes-covered lips and teeth; temperature ranging between 102 and 104; diarrhea; no rose spots; hebetude; early epistaxis. Repeated examinations failed to reveal any agglutinating property of the blood. The subsequent history of this case was not that of typhoid, the grave fever symptoms disappearing two or three days after the examination. This patient, it may be interesting to note, developed instead a mild form of insanity, which persisting, he has since been committed to the State Asylum in this city.

In case No. 41, in which the typhoid condition and symptoms were also very suggestive; examined on the fifth day of the disease, the reaction was negative and our opinion, rendered in accordance, elicited the counter-opinion from the attending physician, a gentleman of wide experience, that he *knew* his patient had typhoid fever, notwithstanding. The subsequent clinical history of the case, however, did not justify his diagnosis, the joint lesions of rheumatic fever developing a few days later, typically. While many, especially of the etiologically obscure continued fevers, remain still to be submitted to the test, such work as has thus far been done seems in a remarkable degree to confirm its great value in diagnosis.

Widal concludes, as the result of his admirable work upon this subject, that: "A negative result obtained with the serum of a case of suspected typhoid, affords a presumption against the diagnosis of typhoid fever; but it is only a probability, especially if the exanination has been made in the first few days of the disease. The examination should then be repeated in the next few days. The presumption that a case in which a negative result has been obtained is not typhoid becomes correspondingly stronger as the disease becomes more advanced."

As supplementing investigations regarding the diagnosis of typhoid fever by means of the typhoid organism in the blood, we have made experimental observation upon the reverse problem, to wit: The detection, by means of the serum, of the typhoid bacillus in water, an important problem usually attended with much practical difficulty and often of doubtful result. The bacteriologic examination of drinking water resolves itself, ordinarily, into a search for the bacillus of Eberth and its differentiation when presumably found from the bacilli coli communis and other allied motile water organisms.

Miquel's scale for the classification of the purity of water, ascending from the "exceptionally pure," containing from 0 to 10 bacteria per c.c., to the "very impure," containing 100,000 and upward per c.c while affording an excellent standard limit of comparison, is practically valueless from the standpoint of pathogenesis; water classed as "very pure," containing but 100 bacteria per c.c., may be more dangerous than the very highest of this scale.

We demonstrate under the microscopes upon the table, the results obtained from an analyses of a specimen of ordinary hydrant water, infected with the bacilli of Eberth from a pure culture, and at the same time with "colon" bacilli and a number of other motile water bacteria.

Mixing in sterile tubes each containing 10 c.c. of beef tea, a few drops of this water, adding Parrietti's solution (ac. carboli., 5 grams; ac. hydrochlor., aq. dest., grams 100) and incubating at 40 degrees C. to eliminate most of the ordinary water bacteria. The tubes were plated (using agar) and these were maintained at 40 degrees C. for twenty-four hours, when we could distinguish with dry lenses, colonies suggestive of the typhoid bacillus by their landscape appearance.

With the sterilized needle these colonies were fished and after proper dilution active typhoid serum inoculated with the organisms. The specimens upon the table are hanging drops of the serum thus prepared. The colon and other motile organisms in the same serum are seen independently and moving in the field. The typhoid bacilli, proved to be such by animal inoculations and other tests, in striking contrast are agglutinated and motionless.

These results indicate that typhoid serum affords a simple and apparently certain means of differentiating the typhoid from similar organisms found in water, or at least, of corroborating results obtained from other methods of analysis.

Tincture of Moringa as Remedy for Icterus.—Dhargalker of Bombay, has secured remarkable results with the bark of the root of the Moringa pterygosperma in eight cases of catarrhal icterus, administered in a tincture prepared from the bark of the root, 2 to 4 grams, three times a day for adults, and 15 drops for children.—*Semaine Médicale*, December 23.

FAILURES OF MIDWIVES IN ASEPSIS.

Read at the Meeting of the Obstetric Staff, Chicago Health Department, November 21, 1896.

BY C. S. BACON, M.D.

PRESIDENT OBSTETRIC STAFF, CHICAGO HEALTH DEPARTMENT; PROFESSOR OF OBSTETRICS, CHICAGO POLICLINIC.

The need of this movement, that we now assist in inaugurating, which contemplates the control of the practice of midwives, is generally acknowledged. The credit for its origination belongs wholly to our experienced Assistant Health Commissioner, Dr. Reilly. It is the first practical and promising attempt in America to regulate midwife practice. I believe that we, the members of the staff, have an unusual opportunity to do a valuable service to the community.

Our work is humanitarian and based upon humanitarian motives. I believe that the chief consideration that induced each of us to enter into this work was that of benefiting the community. No doubt the legitimate desire to enlarge our experience through the observation of unusual and interesting cases had its influence on all of us; also the advantage to be gained through association with others interested in the same specialty. Yet back of all was the fact which our observation and experience have shown to exist, that the health and lives of many helpless and innocent people are jeopardized through the illegitimate practice of midwives. Just as the medical profession is always ready to unite in any well-digested effort to stamp out or prevent an epidemic of disease, so, when once a chance was given us, we were all ready to engage in the effort to reduce the well-recognized dangers to which thousands of poor women were exposed through the unrestrained ignorance of their attendants during childbearing, as well as through their unlawful practices to interfere with pregnancy.

These remarks do not imply that our attitude is one of hostility toward the midwives. On the contrary, it is our aim to assist them in their legitimate work. There are about 900 midwives in Chicago, and they attend from 20,000 to 25,000 cases of labor annually. Moreover, a large share of our population is composed of immigrants from Europe who are accustomed to employ midwives. If it were desirable to do away with midwife practice it would be absurd to attempt a thing so impracticable. But it is not desirable. A well-trained midwife can care for a poor woman and her child in a case where the employment of a nurse is an impossibility, better and much more cheaply than a physician. If she confine herself to her proper duties, and if she be trained to perform them and to recognize when she should call for assistance, she is a valuable member of the community.

The objections to midwives are that they are ignorant, especially of the principles and practice of asepsis, that they are prone to usurp functions not belonging to them, and that they often advise and produce abortions. It is the especial object of this movement to correct the abuses in their practice. In the June Report of the Health Department Dr. Reilly calls attention to the criminal practice of midwives, and mentions the fact that the recent records of the coroner's office show thirty-four cases of deaths of unfortunate women and girls from this cause. If in so many cases the responsibility is fixed, how many cases are there where the responsibility is unknown? A recent investigation of the puerperal mortality statistics of Chicago[1] shows that during the last ten years abortion has been assigned as the cause of death 161 times. This does not include cases of death assigned to uterine hemorrhage, septicemia, etc., which, as we know, often result from abortion. It is probable that a great many of these deaths were due to criminal practice. How many were performed by midwives we have no means of knowing, since the physicians called in and in attendance at the death issue the certificates. The common observation of all of us and the facts just cited from the coroner's report, show to what an extent the mortality depends upon criminal midwife practice. We must also remember that not only the great mortality is due to this cause, but a vast amount of sickness likewise results. It is one of the most important objects of this movement to stamp out this criminal practice. In none of the thirty-four coroner's cases was any punishment inflicted on the perpetrators of the crime. Our criminal laws can therefore have little or no effect in preventing the continuance of these crimes. The rules and regulations which will control midwife practice in the future provide that under no circumstances shall any midwife have in her possession . . . any drug or instrument or other article which may be used to procure an abortion. In the enforcement of this provision, as well as in those regulating the scope of their practice, we hope to see these crimes abolished.

Midwives usurp the functions of physicians not only by performing obstetric operations, but also by trying to treat and manage medical and surgical cases. The law-makers of all the States are gradually coming to recognize the importance to the community of a well educated and well trained medical profession, and are insisting upon a four years' special training based upon a thorough preliminary general education, as a requisite to a license to practice. We all know the necessity for a thorough training in anatomy, physiology and bacteriology to a comprehension of the principles of surgery. How then can a woman of limited education in four to six months learn to appreciate the indications for operative interference, to say nothing of the technic of difficult and dangerous operations. The most she can learn is to know the progress of normal labor and to recognize such deviations therefrom as to require her to call for assistance, and to ground herself thoroughly in the details of antisepsis and asepsis. Therefore our rules, following those of all countries whose experience has formulated these restrictions, specify when a physician must be called. Any violation of these specifications shall be considered as proof that the midwife practices medicine, and makes her subject to the penalties prescribed by the medical practice act.

So far the State goes in defining the functions of midwives and in controlling them. It does not directly propose to educate them. However, we must admit that their ignorance of asepsis and antisepsis is practically a very great objection to them. There is much danger from this source, which is forcibly illustrated by the study of the mortality from puerperal infection in Chicago. In the tables already referred to I have obtained the average annual mortality rate from puerperal infection for the decennial periods 1866 to 1875, 1876 to 1885, and 1886 to 1895. In the first period there were 127 deaths from puerperal infection for every 1,000 deaths from all causes of women of childbearing age, namely, women from 15 to 45 years old. In the second decennial period there were ninety-seven deaths, and in the last period seventy-three

[1] See "The Mortality from Puerperal Infection in Chicago," by C. S. Bacon, Amer. Gyn. and Obst. Journal, April, 1896.

deaths. The rate based on the number of confinements shows about the same rate of decline. In the three periods, for every 1,000 confinements the rate was 7.6, 5.5, and 4.1 respectively. These figures show indeed a decline, and so far are encouraging. The decline corresponds in time to the spread of the teachings of Lister, and is no doubt due to the excellent teaching of asepsis and antisepsis in our medical schools. The fact remains, however, that the mortality rate from puerperal infection is still very much too high, and indeed has increased during the last four years. In 1891 it was 62 per 1,000 deaths of women of childbearing age, in 1892 it was 60 per cent., in 1893 65 per cent., in 1894 71 per cent., and in 1895, 69 per cent. In other words, puerperal infection still kills more women in the prime of life, women of the greatest worth to their families and to the State, than any other cause except consumption.

Who is responsible for this large continuing mortality, physicians or midwives? While it is impossible to answer this question from the imperfect records of the registrar's office, it seems very certain that the improvement for the last decades is due to the better training of medical students, and that the bad results of the last few years are largely due to midwife practice, which has not made corresponding advance.

Hence I claim justification in presenting to this staff the subject announced on the program. The scope of our duties is yet to a certain extent indefinite and will be left to natural development. We are called on by midwives to treat childbed fever. Is it not reasonable that we should try to prevent its development? I look forward to the growth of our organization in such a way that each member of the staff shall have practical charge of the midwives in his district. Like the commander of a company in an army, he shall inspect the records and outfits of the members of his division, and he shall come to feel so far responsible for the practice in his district that he will try to keep the mortality and morbidity records as low as possible. This is the condition in some of the German provinces where the best obstetric results are obtained. It is impossible for us at present to exercise such control. As Dr. Reilly pointed out at the last meeting, it is important that we go slowly at first in order not to wreck the movement at the start by over-zeal. The first thing to do is to secure a complete registration of midwives. So long as a certain number defy the authority of the City Board and the State Board of Health they would defy us and we would accomplish nothing. It will probably take some weeks or months longer to bring the defiant midwives to terms or to revoke their licenses to practice, and until then we must confine our efforts to advice to those who call on us. Yet in this way we can, if we will, accomplish very much of value, and for this reason it seems to me timely that we begin to study the mistakes and failures of midwives and consider the means to correct and prevent them.

The gravest mistakes midwives make in their legitimate practice are in the aseptic management of labor. Their most important mistakes in this direction are the following: failure to secure cleanliness of person and surroundings of patient, failure in subjective cleanliness, use of improper lubricants, making unnecessary internal examinations.

Concerning cleanliness of patient.—Many patients who employ midwives regard the hemorrhage accompanying labor and the amniotic fluid as a kind of filth, and consequently find it proper to collect these discharges in filthy cloths. To them it would be absurd to put on clean bedding before labor, and one finds dirty rags and dress-skirts used for pads. They have, moreover, a great fear of cold, and use feather beds and keep the windows carefully closed. The same fear leads them to avoid the use of water about their bodies. To manage a labor properly under such conditions requires a thorough belief in cleanliness and considerable energy to exert the necessary authority to overcome ignorant prejudice. A midwife, even if she have an idea of the importance of cleanliness, finds it much easier to put up with the surroundings than to improve them. Any one of us who has had any practical acquaintance with the conditions present in such cases will not condemn a midwife too severely for not securing a state of surgical cleanliness. We will also allow for the fact that she can not exert the same authority as a physician. For her assistance it is well that she have very definite and detailed directions to aid her, and to fall back upon in case of opposition on the part of the patient. Such I would formulate as follows:

Have the patient prepare beforehand a piece of white oil-cloth 1½ yards square and at least six clean sheets, and plenty of old pieces of sheets or cloths thoroughly boiled and washed. All should be put together with the baby-clothes in a clean drawer and not handled with dirty hands. At the beginning of labor remove all bedding from the bed, cover the mattress with the oil-cloth and put over it only the clean sheets and the cloths for pads. Under no circumstances use old blankets or cotton comforters, or dirty skirts as pads. Have the patient take a tub or sponge bath with soap and water, put on a clean night-shirt and give her an enema. Do not let her touch the clean bed with dirty or everyday clothes.

Before each internal examination wash the outside genitals thoroughly with soap and the antiseptic solution which is used for disinfecting the hands, but do not give a vaginal douche either before or after labor. If there be a purulent discharge or if the vulva look sore, call in a physician, for these conditions are dangerous and apt to cause fever in the mother or sickness of the child. When the afterbirth comes away remove the sheet and pads, wash the patient with the antiseptic solution, wash and wipe off the oilcloth, and spread over it a clean sheet and clean cloths for pads as before. For a napkin for the patient use only absolutely clean cloths and do not fasten them tightly against her. Afterward change the sheets and pads as often as necessary, and wash the patient every time with clean soap and warm water.

Concerning subjective cleanliness.—Keep the clothes and hands clean. A midwife would better wear light-colored wash-dresses. Under any circumstances she should have a number of large white aprons with sleeves which cover the entire dress to protect the patient and her bed from contamination by the street dress. In cases of emergency she should cover her dress with a sheet.

Great care should be taken to keep the hands free from cracks and from sores about the roots and sides of the nails. If a midwife have any ulcer or running sore on her body she must not attend any labor until the sore is healed. In short, she must avoid all infection of the hands, for it is very difficult and takes much time to clean them again. Before making an internal examination she must disinfect the hands

and arms. This process consists in the following steps:

1. Washing with soap and water as hot as can be borne for ten minutes, using the brush and paying especial attention to the folds of the nails. All finger rings must be removed. A midwife should not wear rings.

2. Cleaning around the nails with a steel nail-cleaner or with a knife until no dirty particle can be seen.

3. Washing another minute with soap and hot water.

4. Scrubbing the hands and arms three minutes in a disinfecting solution. A midwife may use a sublimate solution (1 to 1,000), creolin or lysol 1 per cent. or carbolic acid 3 per cent. The sublimate is the most efficient, but chaps the skin of some people, who may find lysol the best to use.

After disinfection the hands must not be contaminated again by touching anything before making the examination. Hence the patient must uncover herself and flex the thighs so that the midwife need not touch the sheet. Then, with the thumb and fingers of one hand, she should separate the lips of the vulva so that the examining fingers do not carry into the vagina any impurities from the outside.

Concerning a lubricant for the examining hand.—Vaselin and oil, which are generally used as lubricants, are dangerous, for they are good collectors of germs. Even carbolized vaselin, if contained in boxes or jars into which the fingers are dipped or which are exposed to dust and dirt, may contain living germs, for the oily substance protects them from the action of the germicide. The importance of a proper lubricant was well illustrated by a recent report of Dr. Weichardt, the medical officer in charge of midwifery practice in a district in the Duchy of Sachsen-Altenburg in Germany (see *Monatschrift für Geburtshülfe und Gynäkologie*, June, 1896). During the year 1895 there were in his district 1331 labors attended by the thirty-five midwives, with no deaths. The mortality in previous years had been 5 to 6 per cent. Dr. Weichardt suspected the cause of this mortality to be the boxes of carbolized vaselin used by the midwives for lubrication, so he had them provide themselves with collapsible tubes filled with carbolized vaselin. This change alone brought about the ideal result shown in the report. I have ordered from Sharp & Smith such tubes, which will probably be the most practical and safe lubricant for midwife use. Such tubes are also put up by Johnson & Johnson. In a woman who has borne children and also in a primipara, after rupture of the membranes, when the vaginal canal is bathed in the amniotic fluid, there is generally no need of any lubricant. Ordinarily I use soap when any is needed. The collapsible tubes of soft soap are well adapted to this purpose. To use either soap or vaselin in tubes, a little should be squeezed out on to a clean plate or saucer, and with the tips of the sterilized fingers a little is taken up and rubbed over the fingers mixed with the disinfecting solution. Otherwise a piece of hard soap whose surface has been well cleaned can be thoroughly washed in the sublimate solution and then serves very well to lubricate the fingers.

Concerning unnecessary internal examinations.—Professor Leopold has shown in hundreds and even thousands of cases in the hospital in Dresden, that it is possible to conduct labor without any internal examinations. With very little practice it is much easier for any one to determine the position of the child by external than by internal examination. The progress of labor can also be determined by the rate of the descent of the head. Internal examinations are always somewhat dangerous. Germs are almost inevitably carried into the vagina, where they may infect the tears in the cervix or vaginal walls made by the head of the child. The danger increases with the frequency of examination. It is well proven that the chance of fever increases proportionately with the number of internal examinations. Any ordinary case of labor lasting only six to ten hours rarely requires more than one examination to be made. Patients sometimes think that a midwife or doctor assists them by making long or frequent internal examinations. This foolish idea should be dispelled. Let the rule be, examine only when there is a good indication, such as uncertainty as to the position, fear of prolapse of the cord, delay in the labor, or when it may be advisable to learn the degree of dilatation of the cervix. In making the examination do not introduce the fingers into the uterus, and be careful not to rupture the bag of waters.

In this hasty summary of the chief mistakes of midwives in asepsis I have aimed to indicate where they fail by insisting with considerable attention to detail upon the rules of practice which should govern them. While I have not aimed at a complete discussion of aseptic midwifery, I believe that a careful inspection will show that no important detail has been omitted and no unimportant direction included.

426 Center Street.

CLEANLINESS THE FIRST PRINCIPLE OF HYGIENE.

BY WILHELM HOTZ, M.D.
CHICAGO.

Hygiene, the science of health, is undoubtedly the first foundation of therapeutics, the science of restoring lost health, because without knowing the laws which maintain health, no physician can tell his patient the right way that leads him to health and give him the proper advice how to regain it. Hence disease, as we call lost health, must be in one or the other way the consequence of departure from the natural path of life, or, in other words, disease is the indication of the loss of the vital equilibrium; its symptoms are the manifestation of the vital force to regain the normal state.

By studying such abnormal conditions and the way by which nature is seeking to lead the organism back to the prior state of health, we will find out not only the proper way of cure, but learn also how to keep up our health, *i. e.*, the principles of hygiene.

Hygiene is as old as the history of mankind. Its highest development has always been found in the most civilized countries, today as well as several thousand years ago, not because they have the highest civilization—nothing in the world develops without necessity, its motive power—but because the more a people has advanced in so-called civilization the more are the natural laws of life usually neglected, so that it may be doubted whether the high development of science, technics and industries of the modern world is really the result of mental progression, or is not rather the necessary effect of reduced vitality and lessened resistance to morbific influences, accord-

ing to the law of self-preservation. Such *facts* induced man to find means to preserve his species and to study the laws of health to that end.

Hygiene is therefore as old as the history of mankind, but wherever we find sanitary measures, in ancient or modern times, they always relate directly or indirectly to cleanliness. Today we admire the magnificent structures that have been built many thousand years ago by the old Egyptians only for the purpose of securing a pure and abundant water supply. Greeks and Romans built luxurious bathing houses for public use, knowing already that proper care of the body is a potent factor in preventing disease. Had not Hippocrates already taught that prophylaxis is the best part of the science of medicine?

The first hygienic measures in regard to personal health which man recognized are physical cleanliness and abundant exercise. Soon after followed the acknowledgment of moderation in eating, drinking and general manner of living. From the individual experience in relation to personal health resulted, in larger communities, the public health, viz.: general sanitary measures, as, for instance, the regulation of water supply and the securing of pure food by the erection and supervision of public slaughter houses and bakeries, the disposal of the dead and of the excreta, etc. Hence the more the human family developed their faculties in the direction of modern civilization, the more new measures and precautions have been found necessary to protect the public health, till finally the whole affair became a matter of governmental supervision. In brief: All hygienists, from the ancient Egyptians down to the modern scientists, recognized cleanliness as the first principle of health and believed in realizing it by endeavoring to secure pure air, pure water and pure food for the people at large.

The notion, however, of what cleanliness means, its correct definition, was never perfectly clear the same to every body, because the effect of the contrary condition is also not always alike. The man of a good constitution who can stand great extremes, for instance, offers a stronger resistance to injurious surroundings and stands in less need to take care for his physical welfare than a man of more delicate constitution; his idea about cleanliness in regard to his body, food and surroundings, will therefore be not as clear and exact; consequently the conception of *pure* or *impure* is a matter of individual agreement, so long as no certain scientific definition can be given of it. Such a definition can not yet be given in every respect, but it can be very evidently and without doubt in regard to septic materials.

Pasteur, the late French scientist, discovered that all putrefaction is caused by microbes. Other scientists found that in almost all diseases microbes are present, that disease is consequently a process of putrefaction started by certain microörganisms which found their way into our system. But the action (or better), the existence of said microörganisms is fortunately limited, as well as of other living organisms and depends on suitable food; without the proper nutritive elements they are not able to exist beyond a certain length of time, or at least not to propagate themselves. Since Pasteur's discovery we know that no putrefaction of organic matter can take place without the presence of microbes; we know further that all microbes need organic material as a first condition of their existence and that dead organic substance is a more suitable soil for them than living organisms, because the latter offer a natural resistance to all noxious influences. So we find microbes most numerous wherever dead organic matter exists—the primary enemy of health. Hence the quick and complete destroying of all dead organic matter, which is and can not be well protected from putrefaction, would be the best method of preventing the spreading of pathogenic microbes, those species which we have chiefly to deal with in health and disease. If microbes were necessary in nature's economy to decompose all dead organic matter in order to set free the latent energy which is stored up in all the higher compounds the organic world represents, it would be different; such seems not to be the case, however, since there are other much more efficacious factors by which dead organic matter can be reduced into single inorganic elements, than by the mediation of organisms, and which force would be better to that end than fire? Why do we not make use of the same wherever it is advisable, instead of allowing the ground on which we live to be soiled by waste and refuse of organic nature of every kind? Why is it that, in contradiction to our modern progress and our knowledge about the origin of disease, we still let the ground get infected by following the old method of burying corpses of men and animals and letting nature take care of them by the way of the most slow and unwholesome process we know of, the action of putrefaction, the same one which we know to be the starting point of almost all diseases? I consider the microörganisms, apart from their fermentive power, as ideal watchmen of health, because their presence and action is quite often the first indication that something must be wrong, or that our body is in an abnormal state of health. Without the prompt action of microbes on diseased tissue it would be extremely difficult to discover the lesion and its origin soon enough to prevent further injury to the system. I can not believe that the pathogenic microbes are the direct cause of disease, but rather think that about in the same way as pure chemical poisons affect the system, disease is originated either by toxic materials, as the products of our *own* metabolism, poisoned air, impure food and bad surroundings, or as in cases of inoculation of specific microbes by *their* products of metabolism. If this view, as given above, should prove to be correct the hygienist has only to deal with poisonous or non-poisonous substances man is liable to come in connection with; while he should consider all the pathogenic, saprophytic and fermentive microörganisms as useful agents and as our natural guardians which protect us from disease. So the deductions from the bacteriologic propositions point again to cleanliness as the first factor to maintain our health.

But not bacteriologic researches alone and their practical demonstrations, show the truth of cleanliness as the first principle in hygiene; still more is this assertion proven by the study and observations made on the human body under circumstances of great sensitiveness to all unfavorable influences.

In cases of direct injuries and wounds, for instance, where the natural protective organs are entirely excluded from action, we notice the influence of any infectious matter first of all and in the most marked way. Thereupon is based, as you know, the aseptic method in surgery. The least carelessness in this respect may be followed by ill effects and shows evi-

dently how careful we ought to be in introducing foreign substances into our system.

Next to the effect of direct infections by wounds, we notice a high sensitiveness of the system to all kinds of impure influences in case of disease. The first thing nature tries to do in case of disease usually is to clean the system from foreign substances and to prevent further supply. Such symptoms as loss of appetite, nausea, vomiting, diarrhea, profuse sweat, etc., tell us very distinctly in what way the body will regain its normal state, and also where the origin of the abnormal condition lies. In nine out of ten cases I am sure that the cause can be traced to carelessness in regard to cleanliness, that there is a lack somewhere, either in reference to cleansing, dressing and general surroundings of the body, or that the internal system has been neglected, the secretory and excretory organs are out of order; so that the poisonous products of metabolism cause a kind of auto-intoxication; but as I said, the practice of cleanliness alone may prevent at least nine out of ten cases of disease.

The first and most important advice, therefore, the physician gives to the sick refers to general hygienic measures based upon good ventilation of the sick room, pure and easily digestible food and proper care of the body.

What the physician *does* and the only thing he *can* do for the sick is certainly to assist nature in its efforts to restore health, and, as far as the symptoms indicate the need of the system, the physician has to be only a true student of nature in order to be also a successful physician. Is the surgeon who uses the scalpel to remove, or to reach the diseased part, doing more than assisting nature in its endeavor to get the pus and impure matter out of the system? No; both medical practitioner and surgeon correspond in so doing to the first principle of hygiene.

Cleanliness in every respect is a vital question in infancy. Nothing, I believe, is more fatal for the new-born than neglected nursing, unsufficient cleansing and impure food. The immensely high death rate, especially among the lower class of people, is certainly due to the carlessness with which children are nursed and left to themselves, growing up in filth and fed on impure food, more like animals than like human beings. Indeed, there is still a great field of action for the physician, where he can realize the simplest hygienic measures without having to fear that the health of the people will reach such a high state, and the people itself will become so well educated that every one may be able to be his or her own physician while the practitioner will have to starve! No matter how far off that time may be, it would certainly be better and more honorable for the profession, than is our age of progressive physical degeneration, where almost every one believes himself to be able to act as his own adviser in illness, but in his ignorance swallows drugs and so-called patent medicines in astonishing quantities, according to his fallible judgment, instead of following the natural laws of hygiene, or in case of disease calling for a competent physician.

I think the more man progesses in regard to general civilization and special culture of the mind, the more stress he must lay on general health, if he does not want to endanger all that he has gained through pain and difficulties of every kind for centuries past. And if experience and science clearly teach us that cleanliness in its fullest extent is the first principle in hygiene, as I have tried to prove, then we should strive not only to acknowledge, but still more to apply this axiom of health in all respects. The deeper we go into this matter the more we realize the great truth there is in the well known quotation: "Cleanliness is next to godliness."

1318 Masonic Temple.

THE ADVANTAGES IN THE TREATMENT OF SYPHILIS AT THE HOT SPRINGS OF ARKANSAS.

Read before Arkansas Medical Society in May, 1896, at Fort Smith, Ark.

BY EUGENE CARSON HAY, M.D.

PRESIDENT OF HOT SPRINGS MEDICAL SOCIETY; MEMBER ARKANSAS MEDICAL SOCIETY, MISSISSIPPI VALLEY MEDICAL SOCIETY AND AMERICAN MEDICAL ASSOCIATION.

My object in selecting this subject for my paper to be presented for your discussion today was for a two-fold purpose: First, to endeavor to correct many of the fallacies and erroneous ideas in regard to the Springs that exist in the minds of our profession who have never visited the valley. And, secondly: To outline the methods we use in the treatment of syphilis and endeavor to give valid reasons why the Hot Springs of Arkansas enjoys the reputation of being such a Mecca to all syphilitic subjects.

Physicians abroad (at least a preponderating majority) claim that the only virtue the Springs possess lies in the change of climate and removal from business cares, the devotion of the patient to his treatment and care of his health while there. These they claim are the sole reasons why we have such excellent success in the treatment of these cases. And should the same régime be adopted at home, with the institution of ordinary warm baths, equally as good results would be attained.

I will admit that these are very important factors in the handling of these cases, and I will speak of them later. But they are not the primary ones. The true secret of the good results attained at the Springs in the treatment of syphilis lies mainly in the positive clinic fact *that these waters exert a pronounced tonic effect on all syphilitic subjects*, and one that is a daily clinical observation of every active practitioner residing at the Springs. Whether it is because the waters possess more solvent and eliminative powers than ordinary hot water, or that there is some unknown element in allotropic form possessing superior healing virtues, can not be positively stated. Their use is eminently empirical and our reasons for the clinic facts we daily observe are theoretical.

Some of our physicians think that the heat is the sole property, others electricity, others the method in which it is heated beneath the earth's surface, as they think the heat is generated by chemic reaction. And others believe the water contains elements in allotropic form, as I previously referred to. Again others attribute the benefit to the silica held in solution. The heat is of course important, because as soon as the water is cold all its therapeutic value is lost. As to the mineral constituents, to my mind, they are of no significance, averaging about eight grains to the gallon, consisting mostly of silica, sodium, potassium and chalybeate salts.

My own ideas are that the solvent and eliminative powers of the waters are so far superior to all others that it enables the patient to tolerate larger administrations of mercury and iodid potassium with less constitutional distress than can be borne at home, and that the water by its great eliminative powers relieves,

through the pores, the blood of all effete material more rapidly than could be done by any other water.

Before proceeding further I will speak of some of its physical properties. The water comes from the earth through fifty-eight different springs, at a temperature varying from 140 to 158 degrees F., as clear as a crystal, free of all odor and pleasant to the taste, as it is carbonated. If stood in the cold, by ordinary water of the same temperature, it retains its heat from two to three hours longer. This experiment I have tried repeatedly and verified. When cold it makes a pure and most delightful drinking water, but slightly constipating to some people on account, I presume, of the iron it contains.

The bath can not be tolerated at anything like as high temperature as when bathing in ordinary hot water; 100 degrees F. is generally the highest temperature prescribed, 110 degrees F. absolute maximum, and only permitted exceptionally when the subject has a very strong heart and blood vessels free of all signs of degeneration.

In Europe the "Roman bath" is given as high as 150 to 170 degrees F. from 20 to 30 minutes. And I likewise will insert here that tubercular patients grow progressively worse while bathing in these waters.

With these remarks I will pass on to the other advantages I spoke of above, which the profession abroad claim is our sole stock in trade and I concede of great importance. Because, in the first place, when a patient comes here he or she comes for treatment alone and has nothing to attend to but follow the doctor's instructions. When a patient realizes he has acquired a syphilis I do not know anything more pathetic than to witness this poor creature's mental anguish, especially if he is a gentleman. He feels that he is afflicted with a loathsome disease and ruined for life. Hence he must conceal it from even his most intimate friends and, like a criminal at large, using every subterfuge to escape detection, he watches every little blemish that appears upon his body, feeling convinced that should they be noticed his friends or relatives will immediately suspect or recognize his curse, the result of which would be disgrace. This anxiety, combined with his own secret remorse, precipitates him into a most deplorable mental condition and interferes to a large degree with his physician's efforts to effect a cure. Now, gentlemen, what is the result if you send him to Hot Springs? The first is immediate and magical. This mental anxiety is immediately dispelled and his mind is at last at rest, because upon his arrival he finds so many fellow sufferers, and a number whose condition is so much worse than his own, that he consoles himself with the thought that it could have been worse. His unfortunate associates give him their moral support, resulting from a bond of brotherhood and sympathy that exists between them all. He has come to a "haven of rest," where his trouble is treated as an accident instead of disgrace. He sees that it is a disease that is not confined to any certain class. The rich enjoy its "ear marks" as well as the poor; and he starts in upon his treatment with a heart relieved of its burden. As he is there for treatment, and treatment alone, being relieved from all business cares, he becomes a very plastic patient in his physician's hands. He is first instructed as to his diet, which is to stop eating all sweets and acids; his mode of living, which is to keep regular hours; stop smoking and chewing if addicted to the use of tobacco, and abstain absolutely from the use of all intoxicating liquors. The next step is prescribing his medicines and baths. The inunction method is used almost exclusively by the physicians at the Springs, taking the official 50 per cent. ointment and usually dividing an ounce into eight, six or four papers, and rubbing in the contents of one paper each day, according to the exigencies of the case.

The bath is then prescribed, and the general routine for the day is as follows: The patient arising at 7 A.M., breakfasts at 8, then allowing from two and one-half to three hours to elapse so that digestion is thoroughly established, goes at 11 A.M. to his bath, which consists of immersion in the hot water contained in porcelain lined tubs from six to twelve minutes at a temperature from 94 degrees to 96 defrees F.; at the completion of which he is thoroughly rubbed down by his attendent until the skin glows from the stimulation of the peripheral circulation. He is then wrapped in his bath robe and passes into a lounging room that is kept at a temperature of 90 degrees F. He remains there from thirty to sixty minutes; and it is while in this room that the inunction of mercury is applied while the skin is active and the pores open, in the following manner: The patient sits astride of a straight back chair with arms folded over chest and back exposed; the attendent with his hand encased with rubber mitten spreads the ointment over the entire surface of the back, and standing by the patient's side commences with a long sweeping motion exerting an equable pressure distributes the ointment evenly, and continues until the back seems to become quite dry, which takes generally ten to twenty minutes depending on size of inunction. The patient then puts on a light gauze shirt called the "mercury shirt" which is worn constantly under his other garments and is never washed or discarded until he has finished his course. This naturally in course of a week or so becomes quite well saturated with the ointment and is the source of constant absorbtion. The patient then passes into another cooling room kept at a temperature of 80 degrees F., and after remaining thirty to forty minutes returns to his room and lies down before luncheon for about one hour, and he has finished for the day. If iodid of potassium is administered it is generally given in the saturated solution or 50 per cent with some adjuvant like essence of pepsin. I myself prefer the 50 per cent. solution, and use Fairchild's essence of pepsin as it protects the stomach, aids digestion and you do not witness any of the disagreeable gastric symptoms like these produced by the saturated solution alone. Diaphoresis is not encouraged in the bath during the inunction course, because as the emunctories are filled with mercury any excessive sweating would expel what we want absorbed. After saturation is produced the mercury of course is discontinued, at least until the symptoms all subside. About five or six days before the patient takes his departure for home he is instructed to take about as many vapors in addition to the plain baths, which I will detail briefly as follows: Plain bath ten minutes at 100 degrees F., then placed in vapor closet for five minutes standing in a vapor arising from water about 150 degrees F. He is then released and passes into the hot room kept at 120 degrees F. and remains from five to ten minutes. While in the bath and hot room he is instructed to drink the hot water freely. After passing through this you can well imagine the perspiration must be flowing quite freely. He is then removed to the first

cooling room I above referred to, kept at 90 degrees F., wrapped up thoroughly in his bath robe and allowed to cool off. The day before departure, especially if the patient lives in a cooler climate, a plain warm bath is administered and followed by an alcohol sponging to close the pores.

This is a complete synopsis, as briefly as I can state, of our methods.

Before closing I wish to say a few words in regard to the administration of mercury and iodid of potassium. There is no place on this continent where such enormous doses of either of these drugs can be given and produce such slight and mild constitutional disturbances as at the Springs. Patients frequently come here who can not take specific treatment at home and tolerate both mercury and potassium while taking the baths without suffering any inconvenience. When I make the statement that as high as 1000 grains of iodid of potassium has been given in a day at the Springs possibly some of my hearers will be incredulous; but to verify this assertion I will refer you to the remarks about Hot Springs in Dr. Keys' excellent book on syphilis and genito-urinary diseases, page 553, edition of 1890. I recently had a case of cerebral syphilis in which I administered 600 grs. a day. The patient's appetite remaining good, bowels regular, and the drug producing only the ordinary weeping of the mucus surfaces.

That these waters do possess superior solvent and eliminative properties I contend. It is a common experience to have patients present themselves suffering from the baneful effects of mercury, gums tumified, eroded and bleeding upon slightest pressure, when by the administration of a few vapor baths, the inunction course can be instituted and continued without any distress. But a great many of these cases are not due to saturation, but to their former physician's neglect of observing the condition of the teeth before starting them on a course of mercury, and the stomatitis is of local origin caused by the accumulation of tartar or a decayed tooth. Their system is not under the influence of mercury at all, and can instantly be relieved by sending them to a dentist. The reason why such large doses of mercury and potassium can be tolerated at Hot Springs is due to the important part the skin takes in the elimination of these drugs. This is a fact discredited by a great many physicians and ridiculed by not a few; but I believe is equally as important rs the kidneys.

Ronovitch,[1] in 1895, made a series of experiments upon a number of patients to whom mercury was being administered in some form. "A Roman hot bath was used for twenty minutes to induce perspiration and equal quantities of sweat and urine were used for examination. He concluded that the elimination of the drug through the perspiration is much greater than has hitherto been supposed. A relatively larger quantity was excreted by the sweat than by the urine, but this only in cases in which mercury was introduced into the system by friction. This the author explains by the retention of the drug in the sudoriparous glands, friction causing it to be pushed into the glands before it had time to enter the circulation; but the quantity was the same in the sweat and urine of patients treated by injection."

In conclusion I wish to be understood that I do not even insinuate there has ever been a case of syphilis cured by these waters alone. But I do claim emphatically that they act as a tonic when bathed in by syphilitics as no other water will in this country. The mercury and iodid of potassium is received more kindly into the system and all the physical accidents will disappear more rapidly than by any system of treatment that could have been instituted at the patient's home.

[1] Journal Universal Medical Science, November, 1895.

CONGENITAL TEETH.

BY E. S. McKEE, M.D.
CINCINNATI, OHIO.

The following case was presented by the writer to the Cincinnati Obstetrical Society at its April meeting Feb. 22, 1896. Mrs. L. 2-para, bore at eighth month gestation, twins. Both were male and were soon delivered, the first presenting a vertex and the second a shoulder necessitating turning. One was immediately observed to have two inferior incisor teeth presenting. The children were small and poorly developed. The mother was a very small woman. The teeth were both very loose and in continual danger of dropping out. One disappeared at the tenth week, probably being swallowed; the other remained *in situ* until the death of the child, which occurred at the twelfth week; it died in convulsions away from home and the physician who was sent for ascribed the cause of death to meningitis. Premature labor in this case, as that of Crausius, occurred at the eighth month. Helwig at the seventh, and also that of Lann, which is reported as occurring prematurely. The extraction of teeth in the mother during pregnancy was reported by Flesh. In the writer's case two teeth were extracted during the third month. The tooth remaining at the time of the child's death was removed and was exhibited by the writer to the Cincinnati Academy of Medicine. None of the gentlemen present at either of these societies had ever seen a case of this kind. The child was shown soon after birth to about 100 students of the Medical College of Ohio and a number of medical men.

These cases serve as a curiosity for doctors and students and are a sight many do not behold in a lifetime. Some writers claim the possibility of no milk teeth appearing to fill the vacancy left by exfoliation or removal.

The important writers on this subject are Jacobi, Forcheimer, Pliny, Bartholin, Magitot, Schuerig, Ballyntyne, Pierce, Vargas, Buist and Mackenzie.

Congenital teeth are very rare. Paris maternity reports from 1856 to 1863 out of 17,573 births there were only three cases of congenital teeth, or about one in 6,000. Ballantyne in the *Edinburgh Med. Journal*, May 1876, reports 70 cases gleaned from the literature.

Dr. C. C. Surber of Independence, Kansas, writes me that six years ago he delivered a lady of a fine boy, who had two central inferior incisor teeth $\frac{1}{8}$ inch long, very sharp but loose. He removed them at four weeks because of the cutting of the upper gums. He has not seen the child since it was 4 years old but the incisors had not then made their appearance.

Dr. Geo. W. McCoy, Columbus, Ind., reports to me by letter that Dec. 27, 1874 he delivered Mrs. M. of a male child, natural in every respect except two teeth in the upper gums; one full length and size of temporary teeth, the other small and about half through the gums. Both teeth were exfoliated about the fifth week. The child is a hearty and strong man.

This freak of nature has been noticed at wide inter-

vals and with great rarity for a long time. Shakespeare has frequent references to it. In Richard III the Duchess of York says: "Marry, my uncle grew so fast that he could gnaw a crust at two hours old. 'Twas full two years ere I could get a tooth."

Queen Margaret: "That dog had his teeth before his eyes."

King Henry VI: "Teeth hadst thou in thy head when thou wast born to signify that thou camest to bite the world."

Richard: "For I have often heard my mother say: I came into the world with my legs forward. The midwife wondered and the women cried: O, Jesus save us, he is born with teeth; and so I was, which plainly signified that I should snarl and bite and play the dog."

In English and French history we have mention of Richard III, Louis XIV, Richelieu, Mirabau and Mazarin. Inheritance is shown in some cases. In the instance of Mattei, the infant's mother had been born with a tooth, and in Limerick's the mother had two congenital teeth, as did also her second child and a child of her sister.

The etiology of the premature eruption of the teeth is considered due to some abnormal development of the bone; probably most cases have some connection with rickets. In some children who cut their teeth young, the fontanelles close early, but not so in those cases where the teeth are congenital. The enamel is usually very thin or absent. The etiology of congenital teeth is in some instances described as the premature occurrence of the processes which normally lead to the cutting of the milk teeth, in a few cases it is probably due to a true ectropia of the dental follicles and its tooth. Such premature eruptions are usually found in children suffering from improper nutrition or other abnormal systemic conditions.

Treatment: A tooth dangling uselessly and aimlessly in the mouth should unquestionably be removed; otherwise inaction is preferable. The teeth are sometimes so situated as to prevent closure of the mouth, or to make nursing painful and futile, and endanger the nourishment or life of the child. The danger of hemorrhage is probably magnified by Magitot, having lost one child in which the hemorrhage recurred on four separate occasions and proved fatal despite all treatment. He lays down the rule to never extract the teeth. If the child is puny and delicate perhaps syphilitic, hemorrhages a.. possible.

MOVEMENTS OF THE MANDIBULAR CONDYLES AND DENTAL ARTICULATION.

Read in the Section on Dental and Oral Surgery, at the Forty-seventh Annual Meeting of the American Medical Association, at Atlanta, Ga., May 5-8, 1896.

BY W. E. WALKER, D.D.S.

PROFESSOR OF PROSTHETIC DENTISTRY, DENTAL DEPARTMENT SOUTHERN MEDICAL COLLEGE, ATLANTA, GA.

PASS CHRISTIAN, MISS.

This paper is a continuation of the line of thought and investigation indicated in my paper entitled "The Glenoid Fossa; the Movements of the Mandible; the Cusps of the Teeth," read before the Southern Dental Association in November, 1895.[1]

Up to that time I had not been able to find mention of the facts that, in the movements of mastication, the mandibular condyle moves "not only forward but also downward, causing the ramus to drop, in the anterior and lateral movements of the mandible" and that the condyle on the side toward which the jaw is advancing, in the lateral movements, does not merely "rotate on its axis," otherwise "remaining stationary" as we are taught, but that it also moves both upward and backward, very slightly in many subjects, and not at all in some, but considerably in others.

I enlisted the services of men who have access to libraries not within my reach, but even with their assistance, I had been unable to learn of any description of the temporo-mandibular articulation and the movements of the mandible corresponding with my observations. I had therefore concluded that the observations were original.

My paper having been placed in the hands of Dr. E. C. Kirk, as editor of the *Dental Cosmos*, with the request that he would refer me to anything bearing upon these points, he later directed my attention to the report published in the *Boston Medical and Surgical Journal*, July 4, 1889, by Dr. Chas. E. Luce, of the Harvard Dental School, of certain original investigations in the movements of the lower jaw, conducted in the physiologic laboratory of the Harvard Medical School.

It was very gratifying to me to learn that these distinguished investigators, working by widely different methods from my own, had reached the similar conclusion that "certain errors exist in all descriptions of this articulation given by eminent anatomists and physiologists;" a partial explanation of some of the inaccuracies being assigned by Dr. Luce to "the fact that they have made too much use of the cadaver to demonstrate the actions of the articulations, whereas it may be that the contraction of the various muscles coöperating with and antagonizing each other, is the important factor in determining the exact movements of the jaw."

Another cause is in the failure, in studying the temporo-mandibular articulation, to make due allowance for the fact that "in the dried skull the glenoid fossa is emptied of its intra-articular fibro-cartilage, double synovial sacs and membranes, forming altogether a thickness of two or three millimeters, which space will be found, in the dried skull, between the upper surface of the condyle and the roof of the glenoid fossa" making it impossible to reproduce the normal play of the condyle in its socket, and consequently the true movement of the mandible. The published report of the Harvard investigations antedates my own studies by several years, but does not appear to have attracted the attention of the dental world.

Dr. Kirk at the same time directed my attention to the Transactions of the International Medical Congress (Berlin), in which appears an illustrated paper by Dr. Schwarze (of Leipzig), giving an account of his attempts to improve upon Dr. Bonwill's anatomical articulator based upon the study of these Harvard investigations.

Dr. Schwarze failed, however, to grasp the idea of the relations existing between the line traced by the condyle movement and the planes of occlusion and articulation, and the plane of the alveolar process, and therefore missed the essential point, viz., that to secure normal articulation in each individual case, it is necessary to reproduce in the articulator the exact angle formed by the intersection of these lines in the subject.

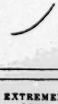
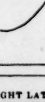
While, in his experimental modifications of the Bonwill articulator, Dr. Schwarze used a movable

joint, it was all haphazard work. Not having recognized the existence of a definite angle, varying widely in different individuals,[1] he naturally made no effort to secure any definite angle in the articulator, and finally abandoned his attempted improvements with the remark that the nearer he approached nature the further he found himself from practical results.

In the words of Dr. Luce "the first requisite in the study of jaw movements is to move the jaw," and the second "to get a permanent record of the movement." In the Harvard school investigation the photographic method of recording the movement of the jaw, was employed. A light frame-work was constructed, reaching around the face from the lower incisor teeth (to which it was securely fastened) nearly to the ear. By adjustable devices bright beads were placed directly opposite the condyle, gonion and symphysis. The subject being placed in strong sunlight, a profile view was photographed, the bright spot reflected from the bead during the motion of the jaw in opening and closing the mouth being continuously photographed, and recorded on the negative *as a line*, giving the actual movement of the place upon the jaw to which the bead was opposed.

As recorded by this device, the mouth being opened to its greatest extent, the movement of the condyle is traced "as a curved line with the concavity upward," the beginning of which, or that portion traced in the "short openings" of the movements of mastication being in the "forward and downward" direction, and—as shown by a study of its illustrations—at about the same incline to the facial line that I had noted as the average in normal articulation.

After the reception of the report of Dr. Luce, in order to more thoroughly study the subject, and to confirm the results of these different methods of observation, I constructed an apparatus somewhat

CASES.	EXTREMELY OPEN.	HALF OPEN.	SLIGHTLY OPEN.	RIGHT LATERAL MOVEMENT.	LEFT LATERAL MOVEMENT.	ANTERIOR PROTRUSION.
Case 10; male, aged 60. Right condyle						
Left condyle						
Case 11; female, aged 50. Right condyle						
Left condyle						

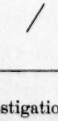
CASES.	EXTREMELY OPEN.	HALF OPEN.	SLIGHTLY OPEN.	RIGHT LATERAL MOVEMENT.	LEFT LATERAL MOVEMENT.	ANTERIOR PROTRUSION.
Case 12; male, aged 28. Right condyle						
Left condyle						
Case 13; female, aged 60. Right condyle . . .						
Left condyle						

TABLE OF CONDYLE MOVEMENTS.

[1] See Dental Cosmos, Jan. 1, 1896, p. 38.

similar to the one used in the Harvard laboratory, and obtained the photographs which I present for your inspection. The white spots show the location of the "beads" and the lines made by this change of position in the movements of the mandible.

No. 1 shows the right side, with extreme mouth opening, showing the distance traversed by the head at the symphysis, one at the region of the first molar and one over the condyle.

No. 2 is the left side, showing the same points.

No. 3 is the right side, showing the distance traversed by the three beads in moving the mandible from right cusp contact to occlusion and over to left cusp contact. The ink mark which was placed on the side of the face before photographing, shows where the bead rested in occlusion, the trace forward being the left lateral movement and back of it the tracing of the right.

No. 4 is the left side, showing the tracing of the beads in moving from occlusion to incisive contact.

No. 5 is a front view, showing the movement of the bead from right cusp contact to occlusion.

No. 1 shows the right side with extreme mouth-opening, showing the distance traversed by the bead at symphysis, one at the region of the first molar and one over the condyle.

To further verify these observations, in another series of experiments I replaced the "bright beads" by a small point of pencil, which traced the movement of the condyle on a sheet of stiff paper, held against the side of the face with the edge parallel with the facial line.

By this method the movements in a large number of cases can be traced in the time required to photograph and develop the negative of a single case.

In edentulous cases I fastened the appliance to the handle of an "impression tray," in which I used Teague's impression compound, additionally securing it by clamping to the mandible when necessary.

By this method I obtained tracings from a large number of individuals, but failed in a single instance to obtain so great a curve, or proportionately to the size of the illustration, so long a line as shown in the Luce report. However, his curve was apparently derived from the movement of the condyle when the mouth was opened to a very extreme degree.

The Luce illustrations are given as a correct reproduction of the photographs, with the relative proportion observed between the width of the face and the extent of mouth-opening.

Assuming this to be the case, the subjects opened the mouth much wider than I have been able to obtain. I have measured the mouth-opening compared with the width of the head sighted from the front and find that the mouth-opening is less than one-third of the width of the head, while in the illustration showing a front view it is more than one-half as great.

These tracings are spoken of by Dr. Luce as being "interesting to dentists, as they show what has to be contended against in taking the bite preparatory to the insertion of an artificial substitute."

But a far greater interest attaches to the corelation of the line traced by the condyle in the movements of the mandible and the facial line.

There is a certain definite corelation between the morphology of the morsal surfaces of the teeth and the angles made by the intersection of the functional portion of the condyle path[2] with the facial line, which I call the condylo-facial angle; also the angle

No. 2 shows the left side with extreme mouth-opening, showing the distance traversed by the bead at the symphysis, one at the region of the first molar and one over the condyle.

made by the intersection of the condyle-path with the plane of occlusion (or the alveolar plane in edentulous subjects), the condylo-occlusal, or the condylo-alveolar angle, as the case may be.

I show the tracings in two cases, taken:

1. With the mouth opened to its fullest extent.
2. With the mouth half-opened as in admitting food to the mouth.
3. Short openings as in biting and grinding the food.
4. Right lateral, and
5. Left lateral movements of the mandible.
6. Anterior protrusion.

Only the first of these were recorded by Luce, and that seemingly exaggerated.

The cusps and incisive edges of the teeth come in contact only in the short openings represented by the straight portion of the upper end of the line traced in the lateral and protruding movements, and it is that portion of the tracing only that bears any relation

[2] I mean that short straight portion of the condyle tracing forward and downward made in the movements of mastication, extended till it intersects the facial line.

to the cusps of natural or artificial teeth, the angles formed by the intersection of the extension of this portion of the line with the facial line and the oral planes mentioned being the angles in which we are interested in our studies of the movements of the mandible in connection with dental articulation.

In the paper before referred to[3] I gave the conclusions which I had deduced from my experiments in the articulation of the models of natural teeth, and the great variations found in the condylo-occlusal angle of different subjects—ranging as I there stated from 22.5 degrees in one case to 45 degrees in another, those being the greatest extremes noted up to that time. More extended observation, however, has shown an even greater range.

Having proven to my own satisfaction the fact of this variation in the condylo-occlusal or condylo-alveolar angle, I constructed an articulator with an adjustable angle to reproduce these variations—with degree gauges to record the measurement of the angle, which varies not only in different subjects but also very considerably in the movements of the two condyles of many individuals.

No. 3 is the right side, showing the distance traversed by the three beads in moving the mandible from right cusp contact to occlusion and over to left cusp contact. The ink mark, which was placed on the side of the face before photographing, shows where the bead rested in occlusion, the trace forward being the left lateral movement and back of it the tracing of the right lateral movement.

I have also constructed an apparatus which I have called a facial clinometer.

This device registers the direction of the condyle path, and of the plane of occlusion (or the alveolar plane of edentulous subjects) as compared with the facial line, and measures in degrees the angles formed by the intersection of these lines, also the "classic facial angle," the mandibulo-facial angle, etc.

It also measures in millimeters the distance that one condyle moves forward with the synchronous backward movement of the other condyle, in the function of mastication.

I quote from Holden's Human Osteology: "In masticating we can readily feel that one condyle advances toward the anterior margin of the glenoid cavity, while the other recedes to the posterior."

The authorities are not in accord on this point, but the clinometer shows it very plainly; it is true that in some subjects the condyle does not move back at all, while in others it recedes considerably, and often one condyle recedes more than the other.

The ratio between the forward movement of one condyle and the synchronous backward movement of the other varies greatly in different individuals, and even in the same individual the ratio often varies in the left lateral movement as compared with the right.

This distance-measurement is registered in millimeters by the clinometer and also on the articulator, where it serves to correspondingly regulate the distance at which to place the bite-correcting fulcrum-screws from the condyles of the articulator.

The importance of being able to recognize the extent to which, in any given case, one condyle recedes as the other advances, and of being able to utilize the observation is shown by the following diagram:

The mandible, as we know, is based on the equilateral triangle, the sides measuring four inches.

In the diagram, A and B represent the condyles, C the point between the central incisors.

If we imagine that the mandible is thrown to the left, and that the left condyle A does not recede, B,

No. 4 is the left side, showing the tracing of the beads in moving from occlusion to incisive contact.

the condyle of the right side takes the position of B′, while C, the median line of the incisors, travels to C′. In the molar region F travels to F′ on the left and H to H′ on the right.

But in a case in which the right condyle, B, advances the same distance as before, while the left condyle, A, recedes one-third of that distance, moving to A″, we will find that the entire triangle acts as though turning on the fulcrum D.

C instead of moving to C′, will reach C″, while F will have moved to F″, and H to H″.

In constructing a set of teeth for a subject in whom, by reason of the condyle receding on the grinding side, the fulcrum is at D, as shown, instead of at A, if, by reason of the construction of the articulator the fulcrum is immovably fixed at A, instead of being movable to suit the case, we would find the articulation at fault to the extent of the difference between the points F′ and F″, H′ and H″, C′ and C″ respectively, causing inevitable interference of the cusps, necessitating

[3] See Dental Cosmos, January, 1896.

either the sacrifice of the cusps or the reconstruction of the set.

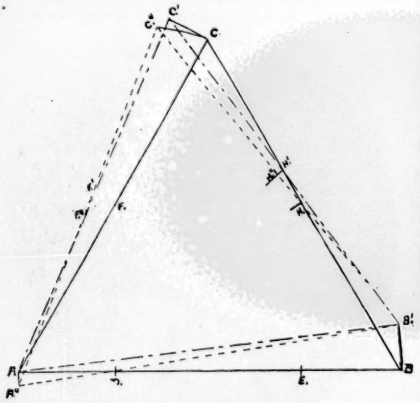
There are two reasons why teeth mounted upon plates should have cusps.

Dr. Bonwill points out that it is necessary in order that there may be a reciprocating or balancing articulation; that is, that when the incisors are brought in contact the molars will also touch to balance, and that when the buccal cusps of one side are brought in contact for the purpose of grinding food, we may have a balancing contact on the opposite side, the upper lingual cusps resting upon the lower buccal.

This "balancing articulation" I have illustrated on pages 39 and 40 of the January, 1896, *Cosmos*.

Dr. G. V. Black, in his recent experiments with the dynamometer, has shown that the subject wearing plates can not exert nearly so much force as those having the natural teeth.

He also found, in studying the physical characteristics of foods, that it requires very much less force to comminute food with a cusped crusher than when placed between plane surfaces.



This is the second reason why cusps are necessary to artificial teeth, and in fact, even more essential to teeth inserted upon plates than to the natural teeth.

It is much to be regretted therefore, that so many of the unfortunate people who have to wear plates which deprive them of a portion of the crushing power, should also, from lack of an adjustable articulator, be deprived of cusps upon the artificial teeth, thus still further diminishing their masticating force.

In my work thus far I have used only a heavy, clumsy working-model of the clinometer, made of brass in order that it might be altered as found necessary in the test of actual use. I hoped to have it here in its perfected form, made of aluminum, but have been disappointed.

Photograph No. 6, however, represents the head-piece of the clinometer in position (the jaw-piece, which is secured to the lower jaw to indicate the movement of the condyle, being here omitted).

An adjustable frame surrounds the head, resting upon it at the points A and B. A slender, dependant piece C, not very clearly shown in the photograph except on the forehead and just at the base of the nose, indicates the facial line. The piece D set parallel with C by the set-screw E, and held rigidly in position by the brace G, carries the adjustable transverse piece H, the degree gauge I registering the angle formed at the intersection of D and H.

In this position it serves to register the condylo-facial angle when H is placed parallel with the condylo-path indicated by the jaw-piece when the latter is in position and the jaw moved as herotofore described, a point over the condyle traveling freely in the slot of the loosely adjusted transverse piece H, the latter being fixed by a set-screw when its direction has been determined by the movement of the condyle pointer. The position of the transverse piece H can also be changed so that it will register the "classic facial angle," the maxillo-facial angle, etc.

The same dependant piece D, when placed in front of the face supported by the projection J and the brace K, and placed parallel with the facial line indicator C, and using the same transverse H and degree gauge I, serves to register various other angles.

Photo. No. 7 shows a modification of the transverse H, which enters the mouth and indicates the plane of

No. 5 is a front view, showing the movement of the head from right cusp-contact to occlusion.

occlusion—not from the incisive edges and cusps of the upper teeth with the mouth open, but the morsal edge of the lower incisors and the summit of the cusps of the lower first molar when in complete closure.

To obtain this plane, points are affixed to the device which enter the sulcus of the upper molars to exactly the depth of the overlap of the incisors when the incisors are in occlusion. This function of the transverse H is also seen in the photograph No. 8, where it serves by other slight modifications to measure the plane of occlusion as described, also the plane of articulation, the alveolar plane, etc.

The angles and measurements thus recorded by the facial clinometer not only fully confirm the deductions from my experiments with models of the natural teeth, but show an even greater range of variation in the angles in question, not only between different individuals, but in the movements of the two condyles of the same person.

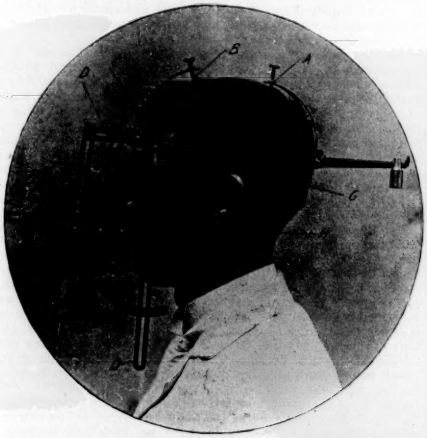
It has been said: "In the domain of organic life

there is rarely perfect symmetric correspondence in the two halves."

This condition was therefore anticipated, but not to the remarkable extent demonstrated by actual measurement.

I will cite two remarkable illustrations of this great variation:

One, a gentleman of 60 years, for whom I made full upper and lower sets. He had never worn plates before. The clinometer recorded the condylo-alveolar angle as 1 degree on one side and 10 degrees on the other, with which angles in the articulator a reciprocating articulation was obtained. This case was the lowest angle I have ever encountered, but it is largely due to the fact that his molars were lost some years ago, while a pair of bicuspids and the incisors have only been removed a few months. Thus the alveolar process is greatly absorbed at the rear but scarcely any at the anterior portion. When absorption takes place in front the angles will undoubtedly become greater.



No. 6. The facial climometer in position.

The second case is that of a lady 70 years of age. She has natural teeth below but has worn an artificial set above for over twenty years, having had different sets made but not with satisfaction, not having been able to bite.

The condylo-alveolar angle in this case was 22 degrees on one side and 44 degrees on the other. The variation was so great that I doubted the correctness of the record. Not wishing to trouble the patient with a repetition of the measurements, in placing the case in the articulator I made a compromise, taking 5 degrees from one side and adding 5 degrees to the other.

But I found it impossible to get a reciprocating articulation until I had restored the angles to the clinometer record. This was a peculiarly difficult case, not only because of the extreme angles but because the lower molars were worn by contact with porcelain teeth above, and the lower incisors having been relieved of all work were long, and the patient was unwilling to have them shortened.

The articulators devised by Drs. W. G. Bonwill, E. T. Starr, W. W. Westmoreland and more recently by R. H. Antes, have both a lateral and a protrusive movement, but inasmuch as they fail to reproduce the drop of the ramus due to this hitherto unrecognized combined forward and downward movement of the condyle, they do not reproduce the true movement of the mandible, and therefore do not permit the normal articulation of the cusps of models of the natural teeth. Consequently they can not be relied upon to produce a correct articulation of artificial substitutes.

The physiologic articulator, with its adjustable angle, its degree and millimeter gauges for recording the measurements taken by its adjunct, the facial clinometer, will probably appear too complex for some, especially as compared with the dental articulators heretofore in use, which, with few exceptions, have been mere occluders.

But to those who desire to give their patients the best results possible, and who are not satisfied with anything short of scientific accuracy, the study of the

No. 7. The plan of occlusion.

mandibular movements as measured and recorded by the clinometer, and reproduced by the adjustable articulator, will be found not only instructive and interesting, but also of great practical value in their application.

As I have said in the article before referred to: "The movement of the condyles constitutes an important factor in many departments of our work, as in its bearings upon the articulation of the teeth, in the study of the cusps of the natural teeth with a view to bettering the articulation, either in orthodontia or in the treatment of the disease commonly known as pyorrhea alveolaris, in the shaping of artificial cusps, whether in fillings, crown, bridge or plate work; in the treatment of diseases of the facial muscles, of the glenoid fossæ, or of plastic adhesions, etc."

The Vogt Prize.—The pupils of Professor Vogt of Moscow collected 2,000 roubles on the occasion of his recent twenty-fifth "jubilee," the income of which is to be awarded each year to the last work on general pathology by a former student of the university.—*St. Petersb. Med. Woch.*

DEFORMITIES OF THE NASAL SEPTUM.

BY J. H. McCASSY, M.A., M.D.
DAYTON, OHIO.

But little success in the treatment of diseases of the upper respiratory passages and the ear can be attained while occlusion or partial occlusion of one or both nostrils exists. It is essential, therefore, that deflections of the septum nasi and other intranasal abnormalities be removed at the outset, so that the ingoing current of air may pass through the nasal chambers and be properly warmed and moistened therein. Physicians will not question the soundness of these conclusions, yet they too frequently let patients thus afflicted go the "rounds" without offering them advice and suggestions as to the necessity of primarily removing intranasal abnormalities for the ultimate success of the management of these cases. Mouth breathing, headache, epistaxis, sneezing, frontal neuralgic pains, insomnia and total or partial deafness are common symptoms of nasal obstruction. Chronic nasal catarrh and septal deformities go hand in hand.

Classification—1, osseous; 2, cartilaginous; 3, osseo-cartilaginous (Jarvis). This is the best and most natural classification. The seat of the deformity is found in the cartilaginous septum in two-thirds of the cases.

Causation—Civilization seems to be a factor of nasal deformity, for the American and European races are prone to them. Collier says about 80 per cent. of the savages are exempt from them. During early life falls or blows on the nose or rough wiping of it, sets up a low grade of inflammation—the perichondrium is over-nourished, new cells are deposited and the cartilage within its unyielding framework bulges to one side from excessive growth. Usually considerable thickening occurs at the eminence forming enchondroma and at the junction of the cartilage with the bone, bony deposits occur forming exostosis.

Case 1.—Deflection of the cartilaginous septum with ecchondroma. Mr. M., aged 30 years suffered for many years with chronic nasal catarrh, pharyngitis and deafness. He complained of fullness in his head, sneezing, frontal neuralgic pain and insomnia. Examination revealed deviation to the left and great thickening of the cartilaginous septum. The ecchondroma was situated about half an inch back from the nasal outlet. This exerted considerable pressure against the outer wall of the left nostril, giving rise to such reflex symptoms as sneezing, headache, frontal neuralgic pain and lachrymation.

An 8 per cent. solution of cocain was applied for eight minutes, which produced anesthesia and shrunk the spongy tissue enabling the writer to view the contour of the parts. A scalpel with a narrow blade was used to excise the redundant tissue. Commencing at the floor of the nostril, the incision was carried inward three-sixteenths of an inch, then curved upward about half an inch. An assistant kept a close watch in the other nostril to warn against cutting through the septum. This precaution precludes the possibility of such a mishap. This operation was completed in a few seconds. A full view of the parts being cut is the safeguard in this operation. Delay will result in obscuration of the parts from hemorrhage. A sharp, narrow-bladed knife will remove cartilaginous outgrowths readily. It being impossible to determine beforehand the presence or absence of bony tissue the writer usually begins the operation with the knife, only using the saw and alligator forceps when absolutely necessary. A 12 per cent. solution of the nitrate of silver was brushed on the cut surface to aid in arresting hemorrhage. In a few minutes bleeding ceased. The nostril was then washed out with Dobell's solution. The patient was directed to blow the clots out. The nostril was then packed with cotton saturated with carbolized vaselin. This dressing was used for two weeks, being changed once or twice daily for the purpose of cleansing. As a result of this operation a good patulous nostril was secured and septum straightened considerably. The naso-pharyngeal catarrh yielded kindly to astringents of nitrate of silver and chlorid of zinc and alkalin and albolene sprays. The reflex symptoms complained of soon disappeared.

Case 2.—Exostosis and ecchondroma with deflection of the septum. Mr. S., aged 45 years, a bookkeeper, was referred to the writer by Dr. Ensey in July, 1896, for naso-pharyngitis, and on-coming deafness. Examination showed that the septum was but slightly deviated to the right, but a large exostosis and ecchondroma, located about half an inch back from the nasal outlet, occupied the floor and septal side of right nostril, shutting off the passage of air. This precluded the possibility of using the Eustachian catheter in the right ear.

Under cocain anesthesia, with the scalpel an elliptical portion of the mucous membrane was removed from the eminence of the outgrowth. A mastoid curette was used to separate and push back about a quarter of an inch the mucous membrane toward the base of the tumor. The knife failing to cut the exostosis the saw was used for a while, but owing to the shape of the tumor the saw could only be used to outline the cut both above and below. Then the alligator cutting forceps was used and the growth cut or twisted off in five pieces. Hemorrhage was pretty free for a few minutes. The parts were cleansed with Dobell's solution and the mucous membrane was coapted as nearly as possible without stitches. The nostril was packed with cotton saturated with carbolized vaselin. The after-treatment was the same as in Case 1. Healing was uneventful; a good patulous nostril was secured and the catarrhal symptoms soon diminished.

Case 3.—Deflection of the nasal septum without exostosis or ecchondroma. Mr. T., aged 35 years, was referred to the writer by his family physician in March, 1893. He was a mouth-breather and had copious secretions from his naso-pharynx and from his right nostril. As long as he can remember he has suffered with headache, sneezing and frontal neuralgic pains. He said he had taken a barrel of medicine without getting any relief from his trouble. Examination revealed an enormous hypertrophy of his right inferior turbinal and the cartilaginous septum was curved to the left nostril so as to press against the outer wall of the left nostril, completely occluding it.

The hypertrophy was removed by two linear incisions to the bone drawn from the back to the front with the cautery knife heated to a white heat. This was done under cocain anesthesia at two sittings.

Then under cocain anesthesia an operation was made in the septum with an old cataract knife. An incision an inch long was made horizontally from before backward; another incision one-eighth of an inch in the middle was made below the first one, which tapered to nothing at either end. This permitted an elliptical portion of the cartilage and mucous membrane to be removed. By means of two vertical incisions a similar but shorter elliptical portion of the septum was removed. This made a stellate opening in the cartilaginous septum. (Max Wocher of Cincinnati had made to the writer's order a clamp with the blades over an inch long by three-fourths of an inch wide. When the blades were clasped firmly they were held in place by a set of screws, each blade had a hole in the center of it one line in diameter for the purpose of drainage.) After the hemorrhage had ceased the parts were cleaned and the clamp applied firmly by a pair of long forceps. The firm pressure straightened the septum and coapted the cut edges nearly. The clamp was worn for three days, being removed daily and the parts cleansed. A few doses of morphin were given to allay the pain and uncomfortable feeling arising from the pressure of the clamp. At the end of the third day the clamp was displaced by a perforated hollow rubber splint which was worn for two weeks, being removed daily for cleansing purposes. Healing occurred without interruption. The case remained under treatment for three months, during which time the naso-pharynx was brushed every second day with a 2 to an 8 per cent. solution of nitrate of silver and sprayed with Dobell's solution, each treatment being concluded with a spray of albolene containing a grain to the ounce of both carbolic acid and menthol. At the end of this time the naso-pharyngeal catarrh was practically cured and the headache and neuralgia had disappeared.

These cases are not reported here for uniqueness but because they represent fairly well the prevailing types of deformities of the cartilaginous nasal septum, not including spurs. The line of treatment adopted is simple, but successful. No clamp or reasonable amount of pressure will straighten simple deflection

of the septum while too much tissue remains in it. The redundant cartilage or bone must be removed. Fortunately simple deflection of the septum is rare. Not many cases will require the operation described in Case 3. In the great bulk of cases if the redundant cartilage or bone is pared off and the septum thinned thereby, the tissue in healing contracts and helps to straighten the septum and a good breathing space will be secured. The writer usually adopts the simpler operation first, leaving the clamp operation as a last resort. Indeed it is difficult to get patients to undergo the clamp operation. In cases having no manifestation of syphilis or scrofula little fear need be entertained for perforation or ulceration; delayed healing may occur but not the former. It is not necessary to be too penurious about the loss of a little mucous membrane. It will readily reform and produce a healthy secreting surface.

32 West Fifth Street.

FOLLICULAR OR CROUPOUS TONSILLITIS.

Abstract of a paper read before the Falls City Medical Society, December, 1896.

BY P. RICHARD TAYLOR, M.D.

Professor Materia Medica and Therapeutics, Clinical Lecturer on Diseases of the Eye, Ear, Nose and Throat, and Dean of the Faculty of the Hospital College of Medicine; Member of Kentucky Medical Society, etc.

LOUISVILLE, KY.

Follicular tonsillitis usually begins with a temperature of 102 to 104 degrees, accompanied by chills and rigors, a full bounding pulse, throbbing headache, aching of the bones of the extremities and loss of appetite. The tonsillar symptoms do not become prominent until six to twelve hours later. Fulness is felt on deglutition, and a sensation as though a jagged foreign body was projecting from the tonsil; the anterior and posterior pillars and tonsil will be swollen, the follicles will be larger than normal and filled with a gray exudate and coagulated lymph.

At the end of twenty-four hours, the throat symptoms will be markedly exaggerated; the inflammation will have extended to the pharynx, and probably to the larynx; the soft palate will be edematous, the uvula elongated, and the feeling of fulness and stiffness of the muscles of the throat will be increased. There is dryness of the pharynx and greater swelling and edema of the pillars. The deposits in the follicles have become profuse and may be continuous over the surface of the tonsil. The pain has greatly increased and is continuous, being extreme in deglutition; the lymphatics about the neck are usually involved. The attack lasts from seven to ten days, but may be prolonged by the infection attacking first only one tonsil and later the other.

Cause.—The predisposing cause is enlarged tonsils with open crypts and follicles with ragged edges. That it is due to a specific organism is unquestioned. A number of organisms have been found in the exudate, but just which one produces the disease has not been determined.

Treatment.—The temperature, throbbing pain in the head and aching of the limbs can best be controlled with quinin and some of the coal tar derivatives, preferably phenacetin. I get the best results from 2½ grains each administered every two hours until distressing symptoms are relieved. Gargles of very hot water will increase the patient's comfort and lessen edema.

The tonsils, being the seat of the disease as well as the point of infection, demand the greatest attention. The exudate upon the surface of the tonsil can be easily wiped away with a probe armed with dry cotton. Usually, any attempt to dislodge it with the probe from the follicles results in its being pushed deeper into them.

For the last eighteen months, I have adopted a method which renders it easy to thoroughly cleanse the tonsil and which shortens the duration of the attack, and in many cases, seen early, completely aborts it. I use a blow pipe made of soft silver about seven inches long, curved at the smaller end, resembling a long, curved Eustachian catheter; in fact, the catheter can be used very nicely as a substitute. After wiping away with the probe and cotton all exudate from the surface of the tonsil, I then attach this blow pipe to the cut-off from my air receiver, just as I would a spray tube. The curved end should be placed about one inch from the tonsil, the air turned on at about twenty pounds pressure, and the current of air passed rapidly from follicle to follicle, which will completely remove all accumulations.

The follicles are then washed with a solution of bichlorid, 1 to 3,000, with an angular Saas spray tube held very close to the follicles, after which the tonsil and sometimes the surrounding mucous membrane is painted with a solution of nitrate of silver, 40 to 60 grains to the ounce. The application of the silver solution will have a decided anesthetic effect and your patient will experience great relief. Other applications may be substituted for the silver solution, but I have found it serves the purpose best. This treatment should be repeated twice or thrice daily according to the severity of the attack. Iodin should be avoided in all acute stages.

To abort this disease the case must be seen during the first twenty-four hours of the attack, the earlier the better. Even when seen too late to abort the attack, this treatment materially lessens the severity.

Incidentally, I have successfully used the same blow pipe to remove soft accumulations and small foreign bodies from the ear.

THE DIAPHRAGM AND CENTRUM TENDINEUM.

WITH TEN ORIGINAL ILLUSTRATIONS BY THE AUTHOR.

BY BYRON ROBINSON, B.S., M.D.

PROFESSOR OF GYNECOLOGY IN POST-GRADUATE SCHOOL AND POLICLINIC, CHICAGO.

(*Concluded from page 207.*)

The membrana limitans is a very fine, thin connective tissue layer on which the endothelia rest. It if a finely granular, or better, a finely fibrillar or striped membrane. It contains no cells. It has a watery or glass-like transparency, which is plainly observed when the endothelia are fallen off or very lightly brushed off. As Bizzozero and Salvioli have shown, the membrane is not exactly alike over all the parts of the peritoneum, but is perforated over the diaphragm. They say that the perforations of the membrana limitans are situated on the zona tendinea, and the zona peritendinea of the diaphragm. Bizzozero and Salvioli assert that the pores of the membrana limitans have a diameter from four to sixteen mm. and

a round or oval circumference. They occur in groups of fifty to sixty, of irregular egg-shaped form; the pores correspond to the meshes of the fibrous connective tissue. I have examined this glass-like membrane, the membrana limitans, in various parts of the peritoneum, as the diaphragm, omenta, mesenterium ligamentum latum, and there is no doubt about one's ability to see the membrane when the endothelial layers have been carefully brushed off, but we can not always be sure to find it, and it is not easy to isolate. Again, to find the pores of the membrana limitans which Bizzozero and Salvioli say exist only on the zona tendinea and the zona peridendinea of the diaphragm is not at all easy, at least so far as my researches are concerned. It is rather to be said that it is an uncertain process to find the pores. Muscatello made examinations of the membrana limitans on the ligamentum latum of the serous covering of bowel, stomach, liver, spleen, pancreas, uterus and anterior abdominal wall and the diaphragm. He found that the membrana limitans, as Bizzozero and Salvioli has asserted, is perforated on the diaphragm. In no other place could he find pores in it. The method Bizzozero recommends to isolate the membrana limitans is to place large pieces of serous membrane several days in Muller's fluid and then 12 to 24 hours in equal parts

Fig. 9.—Lymph vessels of a man about 30 years old, twenty-four hours after death, pleural side of diaphragm. Oc. 4 ob. 3 R. The diaphragm was penciled. Silver nitr. applied one hour ¼ per cent. Ground substance, 1, not drawn. The larger vessels show quite elongated spindle-shaped endothelia but many of the smaller show very sinuous shaped endothelia indicating that they are capillaries; 2 indicates the confluence of six lymph vessels; 1 shows the ground work of the lymphatic net work. 2 Note the irregular bulging of lymph vessels.

of water and alcohol. Now the endothelia are brushed off with a pencil or washed off with a stream of water. One then tries to seize the membrane with a forceps so it may be isolated. The membrane is then spread out and colored with eosin or acid fuchsin, when one can examine it in glycerin and water. Muscatello notes as all others who have examined the membrane that it is a fine fibrillar structure. It is a membrane of a continuous uninterrupted surface with no pores except on the diaphragm. In my examinations of the membrana limitans I will here record a phenomenon, which few authors note, and that is if the endothelia are brushed off very lightly, or better, washed off, one can occasionally observe small pits or depression in the membrana limitans. These pits or depressions are simply the places where the endothelial cells once were.

The only other author known to me as mentioning the fact, is Muscatello. The membrana limitans is generally thicker over solid organs, such as the liver and uterus. However, one generally finds the membrane on the diaphragm with as much certainty as anywhere. Still, I agree with Muscatello, that one can often find it on the bowel as well. By careful observation one can often see endothelial cells, connective cells of fiber clinging to the membrana limitans at points where it was forcibly torn away. Again, in places it is so intimately associated with the underlying connective tissue that it can scarcely be separated, and a little too strong penciling ruptures it in various directions.

The membrana limitans is a thin sheet of tissue, a continuous membrane on which rests the protoplasmic portions of the endothelial cells. According to Bizzozero, Salvioli, Muscatello and my own researches it is perforated only on the diaphragmatic serosa, and hence arose the explanation of the fact that the diaphragm is the chief point of absorption of the peritoneum. The reason that the mesenterium will remain distended with air when blown up, as Bichat recorded it, is because the membrana limitans is not perforated on the mesenterium.

From considerable research and quite a number of experiments on the peritoneum of rabbits (and other animals) it appears that there is a current directed toward the diaphragm.

So far it appears the diaphragmatic membrana limitans alone posseses pores and is the chief locality of the peritoneum which possess the power to absorb and deposit the colored granules into the subjacent lymph channels. Dubar, Remy and Maffucci assert that there are other localities of the peritoneum for rapid absorption, but this has not been extensively confirmed. I have noted absorption of colored granules in the centrum tendineum, gastro-splenic omentum and about the omentum of the pylorus. The strange reason for the diaphragmatic membrana limitans being the only portion perforated has received no adequate explanation so far. But the diaphragm is an organ of motion and a bed of lymphatics and perhaps the pores are a remnant of the original aperture between the pleuro-peritoneal cavity.

The significance of the perforation of the diaphragmatic membrana limitans and the stream of fluid in the abdominal cavity directed toward it is a practical matter in peritonitis, for it is very suggestive of drainage.

1. In my experiments on animals it was distinctly evident that the region of the diaphragm (including to some extent the omentum minus and root of the omentum majus), was the chief region of physiologic (and ultimate pathologic) activity. The swarm of leucocytes told the story. The particles of Berlin blue almost entirely passed into the vast lymph bed of the diaphragm. With time the particles pass into mesenteric glands and viscera, but this is entirely secondary to the passage into the lymph channels of the diaphragm.

2. It has been found that in puerperal peritonitis the serosa and lymph channels of the diaphragm are intensely inflamed as first demonstrated many years ago by Recklinghausen.

The centrum tendineum is a vast system of lymphatic channels. The credit of making the foregoing views known is due to Dr. Daniel Von Recklinghausen, now professor of pathologic anatomy at Strasburg. He demonstrated this fact by vast personal labors and many experiments, aided by his introduction of the use of silver salts. Ludwig, Schweigger-Seidel, Dybkovski, Klein and others perfected his labors. The very reason that the centrum tendineum has had so much attention is because it is a bed of lymphatics and through it peritoneal fluids will pass carrying with them various kinds of solid particles.

The following are the methods to demonstrate the diaphragmatic lymphatics:

1. By placing a very thin piece of the centrum tendineum of a small rabbit stained with silver nitrate and mounted in glycerin under the microscope we may be able to observe the valvate trunks and the non-valved capillary lymphatics. The serosa is sufficiently transparent to allow the lymphatics to be noted beneath it.

2. By brushing or penciling the abdominal serosa, but especially the pleural serosa of the centrum tendineum with a piece of cotton on a tooth-pick or a camel's hair brush and then subsequently pouring on the brushed surface .25 per cent. solution of silver nitrate for a few minutes one can observe in specimens mounted in glycerin well defined lymphatic vessels and capillaries.

3. To inject into the abdominal cavity of a living animal (rabbit) fluid holding in suspension solid colored granules, subsequently (from 10 minutes to 24 hours) killing the animal, carefully cutting out the diaphragm, brushing its surface and silvering it. Mount small pieces in glycerin when the valvate lymph trunks and capillaries are plainly visible containing the colored granules.

Fig. 10.—From guinea-pig's pleural surface of diaphragm, penciled, stained with silver nitr. and drawn to oc. 4 ob. 3 and reduced ⅓. The object of the cut is to show how the juice canals in the ground substance flows into the lymph capillaries, *i. e.*, the lymph canalicular system and the lymph vessels are directly connected with each other; 1, 2, 3, lymph vessels; 4, 5, 6, denote juice canals in the ground substance which is marked 7, 8, 9, 10. At 11 and 12 observe the juice canals in the ground substance blend with the lymph vessels; 13 and 14, valves of the lymph vessels; 15, 16, endothelial cell and nucleus in the ground substance. This guinea-pig had been injected with a solution of Berlin blue, fifteen hours before death; 17 shows lymphoid corpuscles in the vessel; 20, endothelium of lymph vessels. One can observe the particles of Berlin blue free in the lymph vessels as noted by +. One can see the leucocytes in the lymph vessels and some have enclosed in the bodies particles of Berlin blue. One can occasionally observe particles of Berlin blue scattered in the juice canals. By fifteen hours of peritoneal irrigation are more prominent, and at 11 and 12 is seen the most typical transition of the cells of the lymph canalicular system, into the lymph capillary vessels. With 1-15 oil immersion lens one can discover vast numbers of colored granules overlooked by low power. At 18, 19 and 20 may be seen lymphoid canalicular systems which do not nearly fill the space.

4. The lymphatics may be demonstrated by carefully cutting out a diaphragm of an animal dead as long as twenty-four hours, silvering it and allowing it to remain one-half to several honrs in a solution containing colored granules of Berlin blue. Mounted in glycerin it shows the lymphatics containing the colored granules.

5. Inject into a recently dead animal (rabbit) a fluid containing Berlin blue, in half an hour cut out the diaphragm, silver, mount in glycerin, whence one may observe the lymphatics, capillaries and valvate trunks.

6. The lymphatics of the centrum tendineum fill better if artificial respiration be kept up for ten to fifteen minutes. The peritoneum of the just killed dog and rabbit absorb fluid and solid particles about as rapidly as that of the living animal.

In every method one may expect frequent failures from trauma, *i. e.*, dragging or too much brushing and occasionally too little brushing. After very many trials and experiments to demonstrate the lymphatics of the centrum tendineum, we would give the following simple directions. Kill a rabbit, open the chest and abdomen with as little trauma as possible. Wind a little cotton on a tooth pick and brush the abdominal side of the centrum tendineum with the cotton, wet in the animal's serum or distilled water, gently two to three times. Then pour over the tendon *in situ* .25 per cent. solution of silver nitrate for three to five minutes. Serve the pleural surface of the tendon exactly similar. Now, with the most exquisite gentleness, cut out the diaphragm and place it in distilled water in the sunlight for a few hours. Snip off small bits with sharp scissors and mount them in glycerin. Preserve the whole specimen in Müller's fluid, or 10 per cent of formalin. For preservation the specimen should be dessicated with alcohol, however, a very short time—one minute—or it will dissolve out the silver lines, a half minute in oil of cloves and mount in zylol balsam. If one desires to have a clear nucleus, the specimen should be colored with hematoxolin for one or two minutes, and if a beautiful color is desired for the ground substance, the sub-endothelial tissue, a very dilute alcoholic solution of eosin for about a minute will perhaps be sufficient.

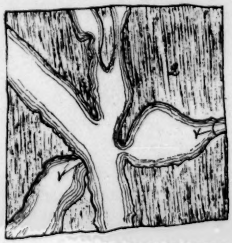


Fig. 7.—Lymph vessels of pleura serosa of diaphragm of rabbit. Ob. 4 oc. 3 R. The surface was well penciled and then stained with a ½ per cent. solution of silver nitr.; v. v. valves. Note the irregularity of outline of the vessels. Ground substance dark. The lymph vessels are dilated.

A curious but significant feature of the centrum tendineum is that where the pericardial sac lies on the tendon, lymphatics fail. There would be no particular physiologic object in having the centrum tendineum sieve-like immediately under the pericardium where it is adherent to the tendon, for the peritoneal fluids would then only pour into the pericardial sac.

The recognition of the lymphatics in the centrum tendineum after the application is easy and perfectly certain. We notice two kinds, 1, lymphatic trunks with distinctly visible valves, and 2, various kinds of capillaries and lymph spaces. By far the most typical location is on the pleural serosa of the tendon. It does not appear that the dog's lymphatic system is so well developed as that of a rabbit or guinea pig, hence, for the purpose of demonstrating, the lymphatics of the latter animals should be chosen. Under the microscope the lymphatic trunk consists of a distinct wall, composed of sinuous or spindle-shaped, nucleated endothelium, which is beautifully brought out by the silver stain. The individual endothelial cell forming the lymph vessel wall may be enormously long, perhaps its major diameter may exceed its minor diameter by ten-fold, showing a very narrow and long spindle-shape, or the endothelia may be very

irregular in shape and possess a sinuous outline similar to the cranial suture. The vigorous emptying and filling of the lymph vessels give elongated shape to the endothelia, as it does in blood vessels. It appears that the endothelia of the lymph vessels possess stomata vera and spuria similar to the peritoneal serosa; however, this is denied by some investigators. The interendothelial space is just the same as that of the peritoneum, *i. e.*, consists of two dark parallel lines crossed transversely by anastomotic protoplasmic processes. But the most significant and characteristic feature of the lymph trunks are the valves which appear on the vessels at very short intervals. The valves are a fold of the vessel wall and pass generally entirely across the wall. Frequently at the valves the endothelia change their course from a longitudinal to a transverse direction. Behind the valve the lymphatic trunk bulges out and one can observe a succession of such dilatations and constrictions of the vessels. In fact, on the pleural surface of the centrum tendineum the lymph vessels have so many valves that they resemble a succession of flasks placed one after the other. Sometimes the valves have a beautiful curve and where the valve exists the vessel is enormously dilated. Vast numbers of lymphatic trunks exist in the centrum tendineum. The lymph trunks are very much wider than blood vessels and if

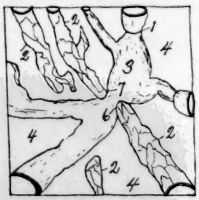


Fig. 8.—Lymph vessels of pleural surface of diaphragm of rabbit. Pencilled and silver nitr. ½ per cent. applied; 1, valves; 2, 2, 2, 2, lymph capillaries with endothelia delineated; 3, lymph vessel trunks whose endothelium is not marked. Note the irregular bulging of the walls; 4, 4, 4, ground substance not drawn. Oc. 4 ob. 3 R. 7 and 7, valves of capillaries opening into the main trunks.

one is puzzled to decide whether the vessels be for blood or lymph, all that is necessary is to trace the vessels to a valve which will decide in favor of a lymph trunk. Again, in blood vessels as large as an ordinary lymph trunk one is able to observe longitudinal or circular muscular fibres; beside the contour of a blood vessel is even while that of the lymph trunk is usually irregular.

The lymphatic spaces or capillaries of the centrum tendineum cover vast areas; in fact, in some specimens which happen to be well silvered and quite transparent, it appears that the whole of the centrum tendineum except where the heart rests and the periphery of the tendon or peritendinea is simply a bed or space of lymphatics. The lymph capillaries or spaces in the central tendon are characterized by sinuous spindle-shaped, or irregular nucleated endothelia. The word sinuous generally best expresses the shape of the endothelia. The capillary lymphatic system of the central tendon is vast and one may frequently note the lymphatic capillaries by looking through the transparent endothelia of the pleural or peritoneal serosa. The lymphatic capillaries and trunks are seen to be connected and all stand in open communication with the peritoneal cavity. Several layers of lymphatic vessels lie in the centrum tendineum, such as the capillaries immediately under the pleural or peritoneal serosa, the vast intertendinous lymph spaces, the straight lymphatics, the deep lymphatics and those straight lymphatics which pass between the tendon bundles to connect the systems of lymphatics of the pleural and peritoneal side of the central tendon.

The distribution of the lymphatics in the centrum tendineum requires some time to determine experimentally and microscopically. The latter method I practiced extensively and found the trunks of lymphatics to pass, 1, toward the costal periphery of the tendon, 2, toward the mammary vessels ventrally, and, 3, toward the dorsal part of the tendon to reach the thoracic duct. The chief field for the lymph capillaries is toward the central portion of the tendon and the vessels gradually widen toward the periphery, finally terminating in four large lymphatic trunks, two dorsal-ward to the thoracic duct, and two ventral-ward to the mammary vessels.

In the physiologic method of demonstrating the lymphatics of the centrum tendineum we injected into the peritoneum of rabbits especially (sometimes employing dogs and guinea pigs) a solution holding in suspension particles of Berlin blue, killing them from a few minutes to fifteen hours later. Shortly after such an injection into a rabbit's peritoneum, say ten to fifteen minutes, the centrum tendineum presents a brilliant display of radiating blue lines passing from the dorsal region of the tendon toward its periphery in the intertendinous spaces. If the tendon is placed between the eye and strong sunlight the blue lines are very apparent. With a strong lens the lines are still more visible. It must be remembered that in some experiments unaccountable failures arise, as we have to do with factors of peritoneal absorption not yet understood. For example, I took a dog of about seven pounds weight and injected 100 cubic centimeters of fluid (composed of NaCl. 2 per cent.; 2 cubic centimeters of a 5 per cent. solution of ferrocyanid and H_2O) into the peritoneal cavity. Killing the dog in fifteen minutes, I found 130 cubic centimeters in the peritoneal cavity, while the same dog dead a few minutes absorbed 25 cubic centimeters in fifteen minutes. I found that dogs and rabbits just dead absorbed fluid almost as fast as they did while living, and also quite a similar standard prevailed in the same dog, dead or alive. It may be noted that the anterior efferent system of lymphatic vessels pass toward the posterior surface of the xiphoid cartilage and eventually along the mammary vessels to the retro-sternal glands, while the two posterior trunks of the central tendon empty into the thoracic duct just anterior to, or above, the point where it emerges from the diaphragm. The lymphatic vessels of each half of the diaphragm can communicate with each other. The lymph trunks of both systems are characterized by possessing spindle-shaped endothelia, many valves and by lying chiefly between the two tendineous layers and the pleural serosa. The lymphatic capillaries emptying into these lymph trunks are characterized by sinuous endothelial walls which possess no valves and have very irregular excavations in different localities and directions. Now, since we have a circular layer and a radiating layer of tendon bundles in the centrum tendineum, we will have straight or radiating lymph capillaries in the intertendinous space of the radiating bundles of tendons. Also straight or circular lymphatic capillaries between the circular ten-

don bundles. We may call them together, intertendinous lymphatic spaces or capillaries. These have quite a uniform breadth with lateral sinuses or bulgings at various intervals. We also have another kind of lymphatic capillaries which lie chiefly under the pleural serosa and are of irregular and variable breadth. Hence we have two kinds of lymph capillaries. 1. The intertendinous, which run straight in a radiating direction and in a circular direction corresponding to the directions of the tendinous bundles of the centrum tendineum. These two systems of deep and superficial lymphatic capillaries communicate generally where they cross each other by short straight vessels; sometimes a large lymph vessel will suddenly become narrowed and pass between two tendon bundles to gain the other side of the tendinous layer. 2. The lymph capillaries which lie mainly under the pleural serosa, of variable breadth, with sinuous endothelia and provided with excavations.

Peritoneal injections holding coloring matter will demonstrate the various kinds of lymph capillaries in the centrum tendineum. The mechanism of the diaphragm is wonderfully constructed for the purpose of acting like a sieve, as a great and rapid absorbent. The chief aid to this absorptive capacity is the motion given to the centrum tendineum by respiration. The narrowing and widening of the tendinous bundles, due to contraction and expansion of the diaphragmatic muscle in respiration urges onward the lymph current. The motion of respiration acts on the centrum tendineum like a pump. The deep and superficial straight lymphatic capillaries aid especially in forcing onward the lymph stream through the spreading and closing of the intertendinous bundles. Again, as persistent anatomic exactness is not characteristic of the lymphatic system, we find peculiar deviations, spiral lymphatics, outside of the various systems mentioned.

Whatever may be the functions of the superficial straight lymphatics of the centrum tendineum, they absorb a wonderfully large amount of coloring matter from the peritoneal cavity in a very short time, both in the living and dead animal. So far as my experiments are concerned, no place in the centrum tendineum is so active in absorption as are the superficial, straight or radiating lymphatics. It appears that respiration dilates and contracts the radiating intertendinous spaces to a very marked degree. The straight, deep and superficial lymphatics seem to me to be the very important lymph channels of the centrum tendineum. In respiration the straight lymphatics are widely dilated, while in expiration they are narrowly contracted, thus allowing them to fill and empty during the motion of inspiration and expiration. The straight, deep and superficial lymphatics connect the anterior and posterior systems of lymph vessels of the centrum tendineum, becoming in this manner an important factor in the onward progress of the lymph through the sieve-like tendon. Perhaps in this respiratory motion lies its evolutionary process, its gradual steps toward its present condition in mammalian life. With the acquisition of more and more lung tissue the diaphragm assumed a wider range of activity. The wider range of diaphragmatic activity brought with it a necessity of considerable separation of musculo-tendinous bundles at the maximum point of diaphragmatic expansion, because the origin and insertion of the diaphragmatic muscles, musculo-tendinous bands are very various and arranged in an irregular circle, *i. e.*, on the irregular costo-vertebral internal circumference. As all tissue spaces are the recipients of variable quantities of lymph the intertendinous spaces of the centrum tendineum from their periodic narrowing and widening, not only become lymph receptacles but important channels for lymph currents, whose extent and rapidity of flow rests on the regularity of diaphragmatic activity. Ages on ages of mammalian life with increasing pulmonary tissue and power only tend to fix and increase this peculiar but significant function of the centrum tendineum. Again, during expiration the large liver presses upward on the musculo-tendinous bundles of the diaphragm, tending to increase the intertendinous spaces and enhancing the lymph flow. An examination of a rabbit or other animal's diaphragm will quickly reveal the vast intertendinous spaces and the enormous amount of fluid they may contain when the tendon bundles are widely separated from each other and how very much fluid would necessarily be forced out by their tendon bundles approaching each other and closing up the vast spaces. One can not assert, perhaps, that all the tendinous bundles are separated during expiration, now that all approach each other during inspiration, but that in all probability the musculo-tendinous bundles separate and approach each other once during one respiration, *i. e.*, a complete act of inspiration and expiration. Therefore, we may assert that the chief absorptive power of the centrum tendineum is due to its straight, deep and superficial lymphatic spaces and the rapidity of the absorption is due to respiratory movements. It must not be overlooked, however, that the quiet diaphragm of a just killed animal will absorb almost as fast as the living one. Death (in non-septic cases) probably does not alter the diaphragmatic structure for four to six hours. In one case I found Berlin blue particles absorbed in the human diaphragm seventy-two hours after death. The experimental physiology of the centrum tendineum will be reported in detail in another place, but in some thirty carefully planned and executed experiments we learned some salient physiologic features of the tendon, which may be summarized with the conclusions of research on the centrum tendineum.

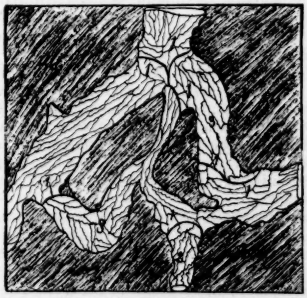


Fig. 11.—Lymphatics of the peritoneal serosa of a rabbit drawn under Oc. 4 ob. 3 R; 1, 1, 1, 1, 1, valves. Note how the endothelia of the lymph vessels becomes directed transversely to the vessels at the valves. The ground substance is simply drawn black to show the vessels plainer. Silver nitr. ½ per cent. is applied for fifteen minutes after pencilling; 2 shows the endothelium passing into capillaries by its sinuous outline. In the lymph channels it is elongated and spindle-shaped; 3, lymph channels and trunks. The lymph vessels are dilated.

1. The diaphragm is the characteristic muscle of

mammalian life, beginning imperfectly in crocodiles and birds.

2. The centrum tendineum consists of four layers, two of serosa, abdominal and pleural, and two layers of tendinous bundles, the radiating and circular.

3. The characteristics of the serosa are stomata vera and spuria and the interendothelial space. The inter-endothelial space is divisible into two parallel lines and crossed by anastomotic protoplasmic processes, resembling a railway with its ties. The endothelial cells are held together in colonies by transverse protoplasmic processes.

4. The characteristic of the tendinous layers is that they possess the deep and superficial straight lymphatics between the bundles, and that these straight lymphatics connect the anterior and posterior lymph system of the diaphragm.

5. The intertendinous lymph spaces between the radiating bundles of the centrum tendineum are covered by a sinuous endothelia of smaller dimensions and more irregular than covers the adjacent bundles of tendons, and possess numerous stomata vera arranged quite regularly in rows.

6. The centrum tendineum is a bed of lymphatics consisting of valved trunks and capillaries of variable width possessing sinuous and spindle-shaped endothelia, lateral excavations and no valves.

7. The rapidity and extent of absorption of the central tendon is due to the widening and narrowing of the intertendinous lymph spaces depending on the motion of respiration. In expiration the radiating intertendinous spaces widen and thus span the lymph space between the tendinous bundles. In inspiration the intertendinous spaces narrow and this forces the fluid onward.

8. The lymphatics of the centrum tendineum stand in open connection with the peritoneum through vertical canals lined by granular, polyhedral cells, whose dilations and contractions regulate peritoneal currents.

9. There is a fluid current existing in the peritoneum directed toward the centrum tendineum.

10. The diaphragm or central tendon is the chief place of peritoneal absorption for colored granules. (I formerly thought it the only place of absorption, but experiments showed a slight absorption in the gastro-splenic omentum of colored granules in the region of the pylorus, and perhaps others will be found by search.)

11. The membrana limitans, so far as my researches extended, is perforated only on the centrum tendineum, which gives a physical explanation of rapid absorption of colored granules through the centrum tendineum.

12. The colored granules wander through the central tendon mainly in a free state and to a less extent enclosed in leucocytes.

13. I can not observe any macroscopic, microscopic or physiologic differences between the centrum tendineum of man and other animals.

14. Lymphatics almost fail when the pericardium and central tendon coalesce. Blood vessels are not constant in location in the centrum tendineum; they are mostly found on the pleural, and sometimes on the peritoneal side, often in the intertendinous spaces.

15. The peritoneal serosa absorbs more rapidly than the pleural serosa.

16. The respiratory movements of the diaphragm act like a pump on its lymphatics.

17. Since the dead centrum tendineum absorbs similar to the living, the so-called "vital" process of the endothelial cells must be questioned.

18. It is the lymphatics that play the rôle of absorptive in the central tendon, and not the blood vessel.

19. The best coloring matter to place in the injected peritoneal fluid to test the physiologic action of the centrum tendineum is Berlin blue.

20. The particles of Berlin blue may be traced in the centrum tendineum in two directions: *a*, toward the posterior surface of the xiphoid appendix to accompany the many arteries; and *b*, toward the vertebral column to empty into the thoracic duct just above where it emerges from the diaphragm into the thorax. This places the non-valved lymphatic capillaries of variable breadth and possessing excavations in the middle portion of the centrum tendineum, with the valvate lymphatic trunks toward the costal periphery.

21. The vast absorptive capacity of the centrum tendineum depends on its direct connection by means of stomata vera with the peritoneal cavity, on its great extent of lymphatic vessels and spaces on the perforations of the membrana limitans, and on the respiratory motion of the diaphragm.

22. The force of gravity, intra-abdominal pressure and contact of fluids against the centrum tendineum enhances the rapidity of the absorption of colored granules. For if an animal is hung up by the hind legs the absorption is more rapid than if he be made to sit up. Also movements, manipulation, massage, kneading of the abdomen, etc., hasten the deposit of colored granules into the lymph spaces of the centrum tendineum. So far experiments do not indicate to me that starving the animal hastens absorption to any considerable extent.

23. I can not observe in the experiments that tying one or both thoracic ducts (*i. e.*, the two innominate veins), retards absorption of the colored granules into the centrum tendineum. But the experiments have shown that if the thoracic duct (*i. e.*, the left innominate vein) be tied, the injected peritoneal fluids appear in the bladder about twenty minutes later than if the duct be left untied. The test is made by injecting fluids into the peritoneum containing 2 to 6 per cent. of potassium ferrocyanid subsequently every five minutes, squeezing the urine out of the bladder and adding ferric chlorid, producing a beautiful blue reaction if any potassium ferrocyanid be present. The test is so delicate that the blue reaction will occur at about 1 to 30,000.

24. The vast and active absorptive capacity of the centrum tendineum with the consequent fluid stream directed toward it is a strong argument against peritoneal irrigation, as any fluid in the peritoneal cavity will quickly stream with its contained germs toward the diaphragmatic tendon, the dangerous grounds of peritonitis. I have frequently observed inflammatory products on the peritoneal serosa in pleuritis and pneumonia. Recklinghausen found violent inflammation on the peritoneal serosa of the centrum tendineum in septic puerperal sores.

Cause of Accidents from Tincture of Iodin.—The hydroiodic acid which develops spontaneously in old tincture of iodin, and is found in the impure article, is the cause of the nausea, vomiting, tympanism, pain, etc., that have been known to follow uterine injections. If present no precipitate forms when water is added to the alcoholic solution of iodin.—*Gaz. méd. de Liege*, December 31.

PECULIARITIES OF THE SURGICAL DISEASES AND INJURIES OF THE NECK.

BY EDMOND SOUCHON, M.D.
PROFESSOR OF ANATOMY AND CLINICAL SURGERY, TULANE UNIVERSITY, NEW ORLEANS, LA.

(*Continued from page 203.*)

Tumors of the neck.—The gaseous tumors of the neck are represented by emphysema resulting from some wound of the air passages or of the lungs in the supra-clavicular fossa; it may be due to fracture of the base of the skull extending to the mastoid cells; it may include all the layers and spread over the whole body; the crepitation of emphysema is characteristic.

Aeroceles (laryngoceles, tracheoceles) are tumors formed by air filling an adventitious pouch; this excludes pneumatocele. The predisposing causes are weakening of the tract and emphysema. The occasional causes are strains (cough, labor). Some are congenital dilatation of the laryngeal ventricles, abnormal prolongations; some are traumatic and due to wounds of the trachea, rupture of the intercartilaginous spaces; some are pathologic, due to dilatation of the glands of the mucous membrane, to ulcerations, syphilitic or due to former disease of the cartilages, or to abscesses; they may consist in a single hernia of the mucous membrane through a rent in the walls, or to rupture; they may consist of all the coats with the penetration of the air in a cavity preëxisting, such as an abscess, or of air into the tissue condensed all around. The symptoms are changes in the voice and resonance upon percussion. The course varies; they are usually persistent. The palliative treatment consists in compression. In some cases extirpation is possible. They present the following forms, varieties and complications: aerocele with brusque development, which may cure of itself; aerocele stationary; aerocele with slow development; aerocele with an irregular course, alternately slow and fast; aerocele simple, due to the rupture of all the coats of the walls, except the mucous membrane; aerocele due to the opening into an abscess; reducible aerocele, which refills by straining; irreducible aerocele, when the orifice of communication has become obliterated; aerocele with alterations of the voice; aerocele due to previous or still existing disease; aerocele with suffocation and dyspnea, calling for tracheotomy. Pneumatocele is due to hernia or great protrusion of the lung into the supraclavicular region; it is recognized by percussion and by its disappearance upon pressure and quick reproduction by forced respiration; pneumatocele follows the respiratory movements.

The liquid tumors of the neck are the following: Liquid hematoma following blows or contusions, or punctured wounds, or incised wounds, when the lips have lost their parallelism; they may result also from a cured aneurysm. Angioma is not very rare; it should be left alone if it does not grow; if otherwise, the removal is indicated, but with all sorts of precautions against the bleeding, which is so profuse here especially; provisional or permanent ligatures of the large vessels above and below should be placed as soon as possible after the skin and fascia are traversed. The tissues are to be divided only between the two artery forceps or two ligatures; injuries to the common carotid or internal carotid necessitating their ligation are grave lesions, also those of the jugular vein especially when divided high up. Aneurysms are frequent on the neck, but their location so influences the diagnosis, prognosis and treatment, that they will be more profitably studied with the regions where they specially belong.

Cysts of the neck are of several kinds and are known under the following names: mucoid cysts (Lannelongue), branchial cysts, deep dermoid, deep atheromatous tumors, congenital hydrocele of the neck, hygromata, atheromatous cysts of lymph nodes. They are almost all rare and congenital, but they are not all branchial; their size varies; they are situated along the course of persistent obsolete tracts lined with epithelium, in the neighborhood of the pharynx and larynx and along the larger vessels; they often have prolongations adherent to the muscles, the vessels, the thyroid cartilage and hyoid bone, and even the vertebral column; they are single, or multiple resembling a bunch of grapes. Their walls are sometimes thick or sometimes thin, or sometimes absent altogether. The walls and their contents vary according to their forms or varieties; their shape is globular or oval; sometimes they present independent masses; they are lobulated, which is due to fibrous or muscular bands crossing them and binding them down; their consistence is more or less soft and fluctuating. They may take a sudden and unexplained rapid course and become very large; they may remain stationary; sometimes they become inflamed and hardened or present intracystic hemorrhage, or undergo spontaneous cure; they may burst externally or in the pharynx; sometimes after having become inflamed and bursted they leave fistulous openings; this may occur also when they have been opened. Their forms and varieties are as follows: Branchial cysts are those which possess a dermoid or a mucoid lining membrane, which form presents two varieties. The mucous or mucoid cysts are lined with ciliated epithelium; they are usually median cysts.

Serous cysts have been confounded with dermoid, mucous or branchial cysts, although they do not, like those cysts, occupy a definite region corresponding to the branchial fissures. The neck is their seat of predilection, and they serve as a type of their description; when they are single or unique, they are almost always on the median line and on the left side; they occupy principally the antero-lateral surface of the neck; they are never as large on the median line, but may be of the size of an orange. Median cysts sometimes spread on both sides, but one side is noticeably larger; sometimes they descend on each side of the chin like a long beard, giving the little patient the strange appearance of an old man. These cysts may exist on both sides; when multilocular they have no special site; when multiple they resemble a bunch of grapes; sometimes their walls are so thin as to be actually absent. They differ from the pure dermoid cysts of the region by containing no hair and no sebaceous substance. Some are lined with ciliated epithelium; they are usually median cysts; they contain water or thick yellow matter. Dermoid or sebaceous cysts or atheromatous cysts are only truly such when the dermoid structure of the cyst walls can be well demonstrated. They may attain the size of a fist; when lateral, they occupy mostly the region of the sterno-mastoid; when median, they occupy mostly the supra- and infra-hyoid regions between the hyoid bone and the thyroid cartilage; the median cysts are sometimes a little to one side. They are often subcutaneous,

although Langenbeck says that in the neck dermoid cysts are more frequently deeply seated than in other regions and are often adherent to the muscles, ligaments, nerves, cartilages, and even to the vertebral column. They are uni- or pauci-locular cysts; they sometimes contain hairs, seldom cartilage or osseous tissue; when they discharge they often leave fistulous openings. The sanguineous cysts at times are connected with the anterior jugular vein; they contain a reddish fluid which characterizes them upon exploration; occasionally they remain in connection with vessels. They are emptied by pressure, but they refill rapidly; they must not be taken for aneurysms when the vessels impart pulsations to them. Hemorrhagic sanguineous cysts are due to intracystic hemorrhages. Punctures and incisions are sometimes followed by intracystic hemorrhage, which may ultimately end fatally. The lateral serous cysts are the worst, because they become the largest and send more and deeper processes. Polycystic cysts, when extensive, are beyond treatment. Hydatid cysts are not so necessarily congenital as the serous. Bursal cysts call for the same remarks; they are usually over the hyoid bone, the thyroid and cricoid cartilages. Purulent cysts or chronic abscesses of the neck may be due to lesions of the glands or of the surrounding bones and cartilages; although slower in their development they are subject to all the changes presented by the acute abscesses above described; they sometimes originate in the sheath of the sterno-mastoid.

The solid tumors of the neck are the following: Deep hematoma with clotted blood due to violent contusions, to punctures and ruptures of the deep blood vessels or to a cured but non-absorbed aneurysm, are occasionally met with. They can be diagnosed by their history, by the exploring needle; they are to be treated by incisions or by gradual dilatation on a guide if they occupy dangerous regions. Sebaceous cysts may so invade the deep tissues as not to be easily separated by the fingers from the deep parts; they are sometimes comparatively rather hard from high tension: the contents are almost fluid, yet the fluid is too thick to run through an ordinary exploring needle. Dermoid cysts present the following features: Branchial dermoid cysts of the neck are almost always of the simple type, *i. e.*, sebaceous matter and little hair, sometimes oil. The complex cysts containing osteo-cartilaginous masses are not really true cysts. Median branchial dermoid cysts of the suprahyoid region belong more properly to the floor of the mouth; these are often attached to the symphysis by a hollow or solid pedicle. Median branchial cysts are the most common mucoid cysts of the neck; their epithelium is cylindric and sometimes ciliated. Dermoid cysts are frequent here; the cyst may be attached to the trachea. These cysts are not bursal cysts; the epithelial lining shows they are congenital; they are all congenital, but they may not become manifest except at a later period, especially at puberty. Lateral branchial cysts usually occupy the region of the sterno-mastoid. Median branchial suprasternal cysts sometimes penetrate into the mediastinum. Median thyro-hyoid cysts often take on a rapid growth at puberty or after a confinement; they are often opened by mistake, and this is followed by persistent fistula with mucous secretions. Lipomata are not uncommon; they usually send fibrous prolongations between the muscles and the vessels, extending sometimes to the bones, hence the difficulty and danger of their removal. Simple adenoma or pure hypertrophy, is not rare. Strumous adenoma is not rare. Adenoma of Hodgkin's disease or multiple adenoma should not be extirpated except to relieve pressure symptoms. Syphilitic adenoma is of frequent occurrence and is found most commonly along the sterno-mastoid or in the posterior region. Syphilitic gumma is not rare. Encephaloid, colloid and melanotic are rarely primary; when primary, they are perhaps developed in the sheath of the vessels and not in the glands; they are almost always due to infection secondary to lesions on the face or the internal cavities. Pulsating encephaloid is extremely rare on the neck. Solidified hematoma resulting from contusions or punctures or ruptures of the deep vessels, or from solidified but non-absorbed aneurysms, are not very uncommon. Simple adenoma or lymphadenoma is the only incontestable primary tumor developed in the neck. Strumous adenoma and tuberculous adenoma are very common; usually they are secondary and the original lesion is found about the face, neck, mouth, nasal cavities or throat; they usually form a chain and sometimes a long solid tumor; they usually ulcerate the skin by a granulomatous infiltration; recurrences are frequent. Schüller recommends for them eight or ten drops of guaiacol after each meal in milk.

Primary syphilitic adenopathy of the neck is seen in cases of chancre of the lips and tonsils; it is usually submaxillary. It is peculiar in that it rapidly acquires a large volume, which is an important diagnostic point. Secondary syphilitic adenopathy is common, especially at the nucha; that is the place to feel the pulse of syphilis, says Ricord. They are usually in the groove between the trapezius, in the fossa of the nucha and in the mastoid region, and are usually due to a lesion of the scalp, but may develop under the influence of the poison in the blood. Tertiary adenopathies are rare; they assume the sclerotic or gummatous form. Syphilitic adenoma presents the same features also, especially in elderly people. Lipoma of the neck presents the following forms and varieties: superficial or deep, the deep have been observed near the large vessels, near the carotids, also in the peripharyngeal connective tissue; congenital lipoma, diffuse and adherent, or not, to the bones; lipoma with a broad base; lipoma with a narrow base, pediculated (one weighed twenty-nine pounds). Diffuse lipoma affects the nucha specially and may encircle the neck; congenital and symmetric lipomata have a neuropathic origin. Fibroma is rare; it rises from the fibrous layers, bones, sheath of vessels, sometimes is embryonic. Congenital branchial fibrochondroma of the neck is seen in all regions of the branchial arches. It occupies almost always the external orifice of a congenital fistula, a little above the sternoclavicular articulation. Myxomata and myomata are rare; one case of chondroma is on record, following chondroma of the scapula; those independent of parotid and lymphatic glands are very rare; some tumors are very large; they may adhere to the vessels and to the deep structures. Cutaneous plexiform neuroma is frequent in the neck. Osteoma is also frequent. Carcinoma, primary and independent of larynx, pharynx and glands, is rare; it may develop in the aberrant lobes of the thyroid. Some are deep, having developed from the branchial arches. Epithelioma is usually secondary to epithelioma of the face, larynx, tongue, pharynx, esophagus, tonsil, pleura, lung or breast. One or two enlarged ganglions, hard, without pain, appearing toward the age of 50, are likely to be an epithelioma.

Sarcoma of the lymphatic glands is very rare, because sarcoma is propagated through the veins. Scirrhus is rarely primary; it is oftenest secondary to other affected parts. *En résumé*, the infectious granulomata of the neck are tuberculous, syphilitic, leprous, glanderous, actinomycotic. Actinomycosis and glanders first show in the submaxillary and cervical glands.

(To be continued.)

SOCIETY PROCEEDINGS.

New York Academy of Medicine.

The New York Academy of Medicine held its semi-centennial celebration on Friday evening, January 29, at Carnegie Music Hall, under the Presidency of Dr. JOSEPH D. BRYANT. The following were the officers on the occasion referred to:

Committee on Arrangements.—Dr. William M. Polk, Chairman; Drs. Robert F. Weir, Charles McBurney, D. B. St. John Roosa, Wm. T. Lusk, A. Alex. Smith, Edward G. Janeway, Landon Carter Gray, Edward D. Fisher.

Committee on Invitation.—Dr. John H. Girdner, Chairman; Drs. Egbert H. Grandin, Clarence C. Rice, Charles Inslee Pardee, Prince A. Morrow.

Committee on Entertainment.—Dr. Daniel Lewis, Chairman; Drs. M. Allen Starr, Clement Cleveland, Nathan E. Brill, H. Holbrook Curtis, Arthur M. Jacobus, T. Mattack Cheesman.

The feature of the evening was an address by the President of the United States, the Honorable GROVER CLEVELAND, which we reproduce verbatim. The President, it would seem, has a very clear idea about the functions of a physician in general as well as of a citizen. It is worthy of reproduction here as a very wholesome tonic to those who hold that the moment a man enters the profession he should forego his citizenship and thenceforward be a political eunuch.

PRESIDENT CLEVELAND'S SPEECH.

President Cleveland spoke as follows:

"I have anticipated the share assigned to me on this occasion with considerable trepidation for various reasons. I have been chiefly disturbed, I believe, because of my inability to discover satisfactory grounds for my right to join those who celebrate the semi-centennial of a medical association.

"If, in passing through that period in boyhood when the desirable choice of future activity seemed to rest between running away from home to be a sailor and staying at home to be a doctor, I inclined toward the more quiet and orderly of these pursuits, this surely furnishes no basis at this late day for a claim of relationship to the medical fraternity. Nor do I forget that less than seven years ago I was accorded the privilege of participating in the exercises when the corner-stone was laid of the building which is now the home of the organization which tonight celebrates its half century of useful and honorable existence. But this incident, which aroused an interest still undiminished in the welfare of the Academy of Medicine, hardly entitles me to a share in the felicitations of those who have since borne the heat and burdens of its work while I have enjoyed the ease and happiness surrounding public station.

REPRESENTS THE LAYMEN.

"In confessing, therefore, that I have no right to even standing-room within the inner circle of the profession, I have boldly and without the least authority determined to speak to you as a representative of the vast army of patients and laymen.

"At the outset, I desire to remind you that you owe us much. Though largely in the majority, and with plenty of members to spare, those who are well conducted among us do not vex you with hurtful competition. Instead of making life hard for you by an observance of the laws of health, we assist you by indulging in all sorts of irregularities. We are obedient and submissive to your commands—that is, when we are sick—and we sometimes pay your bills even after a recovery to health, which we are always certain would have resulted without your interference.

"In these circumstances, if when in perfect health we venture to assert ourselves and tell you what is in our minds, it is not fair to liken us to a certain personage who when sick a saint would be, though very differently inclined when well.

"We begin by conceding most heartily and without the least reservation the learning and skill of those now constituting the medical profession, and the wonderful advance that has been made through their untiring labors and investigations in the alleviation of human suffering and the saving of human life.

TRIBUTE TO THE VILLAGE DOCTOR.

"It may be this seems to you an acknowledgment so much your due as to be hardly worth making. You should, however, value it because it is sincerely made by those who were not born yesterday, but who hold in lasting and tender memory the ministrations of the village doctor of fifty years ago, and are now the living monuments of his faithful care. He, too, alleviated suffering and saved human life. We know that it was not given to him to see the bright lights that now mark the path of medicine and surgery, but you can not convince us that he groped entirely in the dark. We remember without abhorrence his ever-ready lancet and the scars of his blood-letting found in every household. We endure with complacency the recollection of his awful medicine case containing bottles, powders, and pills, which, whatever might be thought of them now, seemed then to be sufficient for all emergencies—to say nothing of the tooth-pulling tools and other shiver-breeding instruments sometimes exposed to view. If he was ignorant of many of the remedies and appliances now in use, he in a large measure supplied the deficiency by hard-headed judgment, well-observed experience and careful nursing. Besides, it was in his favor that he did not have to bother his head with many of the newly invented and refined diseases that afflict mankind today. He had no allotted hours for his patients, but was always on duty; and we knew the sound of his gig as it rattled past in the night.

"Your ways are better than his; but we desire you to regard this admission as all the more valuable because it is carved out of our loyalty to our old village doctor, who brought us through the diseases of childhood without relapse, who saved from death our parents and our brothers and our sisters in many hard combats with illness, and who when vanquished and forced to surrender was present in the last scene to close the eyes of his dying patient and sympathize with those who were present.

FAITHFUL IN ALL TIMES.

"I hasten to say that we do not for a moment suppose that advancement in the science of medicine and surgery has smothered the faithfulness and tender consideration which characterized the practitioner of former days. If we seek charitable service to the sick and suffering, a noble appreciation of obligation to humanity and self-abnegation in the discharge of professional duty, we must look for them among our physicians and surgeons of today.

"If we have now arrived at an understanding, you are, I hope, prepared for a suggestion quite in keeping with the extremely moderate and reasonable disposition that characterizes the patient and layman. You have invaded our benighted contentment and led us out into broad fields of scientific discovery. This has inspired us with a new-born spirit of wisdom and criticism which demands that new and larger fields be opened to our complacent gaze. You have penetrated the places where the germs of disease are hidden. We are quite certain that you should be required to destroy the origin of disease and ultimately usher in the day when the only escape from the world will be through a passageway marked: 'Old Age. Exit.' If this has the appearance of exacting too much, or if business considerations present obstacles to its accomplishment, I think we ought, perhaps, to reduce our claims, or at least give our doctors time to find other employment.

WORK FOR THE FUTURE.

"In the meantime, those of us who are conservative must be allowed to hope that further investigation will continue to point the way to the prevention of disease. For this investigation we must still rely upon the efforts of those who have already done so much in that direction, encouraged and stimulated by such effective organizations as the Academy of Medicine. We are sure that this work, having arrested the attention of the world's brotherhood of medical science, will not be neglected; nor need we fear that America's contribution to splendid results will be deficient.

"In some instances, however, investigation has performed its part and only effective action in other quarters is necessary to supply needed remedies. In such cases, of course, you are absolved from all responsibility in your professional character by exhibiting dangers and warning against them. Thus certain diseases which you deem contagious yet remain imperfectly isolated. You have demonstrated the peril to health of unwholesome water and noxious surroundings; and yet much remains to be done by way of protecting our people against these dan-

gers. You have established a code of ethics which condemns charlatanism in all its forms, and yet ignorant pretenders roam over the land offering to perform miracles, or are located in our towns and cities, preying upon the weakness of the sick and afflicted, while men and women are allowed to lie without medical attention, deluded with the hope that faith will save them in their last extremity. Within the limits of your professional power and influence you seek to restrain any approach to criminal malpractice; yet newspapers disgustingly though covertly advertise the way to such crimes and startle their readers with sensational tales of death and misery to which they are directly accessory.

PHYSICIAN AS CITIZEN.

"I need not suggest that such evils are allowed to exist by reason of the insufficiency of our laws or a laxity in their execution. I have intimated that for this condition you are not responsible in a professional sense, but are you sure you are doing all in your power as citizens to remedy the situation?

"The village doctor was not only our physician, but he was a man of influence in all neighboring affairs. In every matter that concerned the good of the community he was at the front. He was president of the village or represented his town in the County Board of Supervisors, and if he was ever late in visiting a patient it was because he lingered at the postoffice to discuss the political situation. Thus he joined with the performance of professional duty a discharge of the obligations of citizenship.

"We can not but think that the discoveries and improvements in medical practice which we now enjoy are dearly bought if the members of the profession, in their onward march, have left behind them their sense of civic obligation and their interest in the general public welfare. We can not accuse you of utter neglect of your duty to your country; and yet we can not keep out of mind the suspicion that if your professional work in exposing evils were more thoroughly supplemented by labor in the field of citizenship those evils would be more speedily corrected.

URGED TO TAKE PART IN POLITICS.

"If laws are needed to abolish abuses which your professional investigations have unearthed, your fraternity should not be strangers to the agencies which make the laws. If enactments already in force are neglected or badly executed you should not forget that it is your privilege and duty to insist upon their vigorous and honest enforcement. Let me also remind you of the application to your case of the truth embodied in the homely injunction: 'If you want a job well done, do it yourself.'

"If members of your profession were oftener found in our National and State legislative assemblies, ready to advocate the reformatory measures you have demonstrated to be necessary and to defend your brotherhood against flippant and sneering charges of impracticability, the prospect of your bestowal upon your fellowmen of the ripened results of your professional labor would be brighter and nearer.

"While thus suggesting the need of your influence in legislative circles for the accomplishment of reforms related to your profession, you will, I hope, permit me, in conclusion, to enjoin upon you the duty of an active and general interest and participation in public affairs for the promotion of your country's good in all its phases. Our government was founded in the faith and anticipation that those who loved it most and were best able to hold it steady would be at its helm. Without this it will surely go astray. Never did patient need your medical treatment more than the body politic now needs the watchful care of your patriotic and disinterested citizenship.

"No object or personal ambition and no activity of professional life should be permitted to withhold from our government the tithe of devotion and service due from its thoughtful, intelligent and educated citizens. The reward of a willing recognition of our obligation to watch and protect our free institutions and preserve them from weakness and decay, will surely come when a just government supported by the patriotism of a loving people shall bestow with equal hand upon us and all our countrymen the blessing of national peace, contentment and happiness."

SELECTIONS.

The Tribulations of the Medical Profession in France.—We are all more or less dissatisfied with the state of things in the medical commonwealth in these realms; it is interesting, therefore, if not particularly comforting, to note that our brethren in some foreign countries are even as we are in this respect. There is France, for instance, where it is sometimes said the profession occupies a more fortunate position. If we are to believe a distinguished journalist—M. Hugues Le Roux—we have no reason to envy our French *confrères*. M. Le Roux has recently discussed in the *Figaro* the question, Shall our sons be doctors? He answers it, implicitly, with an emphatic negative. In the first place it is not easy to become a doctor. M. Le Roux estimates that, reckoning in the expenses of preliminary education, it costs something like £1,600 to get the diploma. Then comes a weary period of waiting for patients, entailing further expense. If a practitioner starts in a country district he has to face the local "vet.," the *curé*, the bonesetter, and the blacksmith; and he is called in only hopeless cases, so that, with a confusion between cause and effect natural to the untutored mind, he comes to be looked upon with suspicion as a kind of Angel of Death. In towns there are the hospitals, which not only give indiscriminate relief to people of the working class, but take paying patients at charges varying from 2 to 12 francs a day; in these receipts the medical staff has no share. Then there are the clubs, which can always get doctors to serve them at 2½ d. a visit. There is also the competion of unqualified practitioners. In spite of the law—on paper—against the unlicensed practice of medicine, Paris swarms with herbalists and "curers" of all kinds, and the vilest quacks advertise their wares in the newspapers without let or hindrance. M. Le Roux states that there is in a certain town a priest who professes to have a secret remedy for incurable diseases. His door is thronged with patients from 5 A.M. to 8 P.M., and appointments have to be made two or three weeks beforehand. This clerical healer is said to hand over £4,000 each year to his archbishop for the purposes of the Church; what he keeps for himself is not stated. The pharmaceutical chemists, with their various "specialities" and plausibly written pamphlets vaunting their efficacy, are also formidable rivals to the legitimate practitioner. The attempts which have been made by medical associations of different kinds to remedy these evils have so far failed; and, indeed, it is not easy to see how there can be any real betterment in the state of the profession so long as it is overcrowded. If M. Le Roux's article deters any considerable number of parents from making doctors of their sons, it will have served a useful purpose. It might not be amiss if some popular journalist were to enlighten the mind of the British paterfamilias on the same subject.—*British Medical Journal*, December 5.

Treatment of Heart Troubles. Schött's Gymnastics and the Nauhaim Baths.—The *Therap. Woch.* of January 3 contains a comprehensive, practical and theoretical article on this subject by Sir T. Grainger Stewart, Professor of Clinical Medicine at Edinburgh, in which he describes the fine results he has seen accomplished at Nauhaim, with directions how to secure the same at home. He states that there is no group of diseases in which so much can be effected by the physician in relieving and restoring the organs to their normal condition, as in disturbances due to functional derangements of the heart, but that the secret of success is careful discrimination of the appropriate treatment for each individual case. The Nauhaim methods will not supplant the traditional treatment with rest, diet (especially the change to the dry diet recommended by Clark and Oertel) and medicines, in which digitalis takes the lead. But they supplement them with advantage, and used alone or in combination, are of great assistance in the task. Tobacco should be entirely avoided, or only used to a very slight extent after a meal. Alcohol taken regularly, in small amounts and with the meals, is beneficial in cases of heart weakness, especially those consecutive to diphtheria, etc., or caused by old age. The best form is whisky, from 6 to 60 grams once to three times a day, never exceeding 220 grams; the slightest excess is particularly injurious. If taken between meals it should be combined with milk, or better, with milk

and the beaten white of an egg. The importance of exercise is becoming more generally recognized, and benefit is derived from passive gymnastics (Swedish, massage, etc.), which he ascribes to the improvement in the circulation of the lymph in the tissues, as also to the mechanically increased flow of blood through the muscles. Patients are able to stand this form of exercise who would be injured by active gymnastics. But in almost every case the active gymnastics with limited resistance, devised by Dr. Schott of Nauhaim, prove wonderfully effective. They consist of a series of carefully regulated movements, performed slowly and moderately; no movement of any member or set of muscles is allowed to be performed more than once at a time and absolute rest follows each single or combined movement. The movements are not to be such as to accelerate the breathing, and the physician in charge is on the watch for the slightest distention of the nostrils or contraction of the corners of the mouth, change of color in the lips, yawning, perspiration or palpitation. If any of these symptoms appear, it is a signal for the immediate cessation of the movement in course of performance, and the member is at once supported, or otherwise brought into repose. The patient is instructed to breathe regularly and without interruption and in case this is difficult for him, or he holds his breath for any reason, he is reminded to continue breathing and during each movement to count in a whisper. The clothing must be loose so as not to interfere with the circulation. By observance of these rules there is no disturbance of the respiration or heart action, and auscultation and percussion before and afterward convinced Professor Stewart that in a large number of cases the heart sounds grew more distinct, while the area of dulness was perceptibly decreased; the rhythm of the pulse was much improved and the beat stronger. This immediate effect passes away after a while, but the heart seldom returns to its previous dilated condition and remains smaller than before the gymnastics. One case was a Russian official, who came to Nauhaim with debilitated heart action, anasarca, some ascites, slight hydrothorax and in all probability also hydropericardium. The left border was 7 inches from the median sternal line and the right more than $1\frac{3}{4}$. Dr. Schott did not hesitate an instant to order the active gymnastics for him, although the case seemed too advanced for this in the writer's opinion. He was present when it was carried out. The patient displayed considerable nervousness at first, and for moment a disposition to faint, but quickly recovered, and the gymnastics were continued. The seance lasted twenty minutes, and examination afterward showed that the apex beat and the left limit of the dulness had receded $\frac{3}{4}$ of an inch toward the center, the right $\frac{3}{8}$ and the upper border $\frac{7}{8}$. In one month from the commencement of the treatment the patient was completely restored and could climb quite high eminences. The apex beat was in the mamillary line. When seen a year later he was constantly improving, with no trace of hydrops, although he had taken no heart tonics nor medicine of any kind. Similar results were observed in so many cases that Professor Stewart has introduced the system into his own hospital and private practice, with much better results than from passive gymnastics. He ascribes the benefit derived from it to the chemical and physical changes it accomplishes. The circulation is mechanically accelerated and the exercises stop just short of the point at which any extra effort is required of the heart itself. The Oertel mountain climbing exercise is adapted to less severe cases, or to those which have graduated, as it were, from the passive and active gymnastics, but the writer has no personal experience of the method.

A very important factor in the Nauhaim cure are the baths. The waters are saline, 28 to 35 degrees C. in temperature and the patients find them very refreshing. They can be artificially prepared by adding $1\frac{3}{4}$ kg. of salt and 250 grams calcium chlorid to 250 liters water. This corresponds to the bath first given, when the duration is eight minutes. Another is given in two days, after which they are given twice in three days, then three in four days, increasing the length to twenty minutes or half an hour and the strength of the bath by more salt, while the temperature is raised to 30 degrees C. After twenty or twenty-five of these baths a "sprudel" or effervescing bath is given, containing a quantity of free carbonic acid, or a "sprudel" bath in flowing water. This effect can be obtained artificially by adding to the bath described above one package of "Sandow" powders and tablets for a "sprudel" bath and two for a "sprudel" flowing bath. Examination of the patients before and after the baths demonstrated the same decrease in the area of dulness, increased energy of the pulse, etc., as after the gymnastics, while tests of baths in ordinary Edinburgh water produced no such effect, nor even in salt solutions at the same temperature, but as soon as the "Sandow" powders were added to the water and carbonic acid liberated the same results were secured as at Nauhaim, showing that it is the combination of these substances that produces the favorable results, probably owing to some action on the nerves. The Nauhaim cure commences with the baths, which require less exertion of the patient than the gymnastics. He is dried carefully with warm towels by the attendants and protected from taking cold, the feet being kept especially warm. He then takes slight refreshment and rests an hour or more.

Professor Stewart concludes by stating that he finds puncture of the pleura of surprising benefit in many cases of hydrothorax which diuretics have failed to relieve, with even the removal of only a small quantity of the fluid which has been causing dyspnea by its pressure on the heart. In many cases the fluid was found in much larger quantity than the dulness indicated. Ascites required puncture also, but is less satisfactory than the pleural operation. Successful drainage with the Southey canula will often prolong life, but he only resorts to it in extreme cases, on account of the low vitality of the punctured skin. Complications in the digestive apparatus are treated with suitable medication, massage of the abdomen, etc. Torpidity of the liver is often cured by purgatives and external stimulation, acid bandaging and the internal administration of mineral acids and taraxacum. The alteration in the blood requires appropriate iron or arsenic medication, and it is important in every case of cardiopathy to investigate the number of red corpuscles and the amount of hemoglobin, so as to meet any alteration with the proper remedies. The condition of the lungs must also be carefully watched, especially for indications of edema, which must be dispelled by more or less powerful external applications, if possible. Bronchitis also affects the heart action. The patient is sometimes waked up in the night with dyspnea, due either to the condition of the heart or lungs. The best remedies here are whisky in hot water, milk or soup, Hoffmann's drops (ether); in extreme cases subcutaneous injections of ether, strophantus or strychnin. Counter-irritants in the lung or heart region and cupping are also often useful. In extreme dyspnea and cyanosis from inflammatory disease of the respiratory organs venesection is indicated and the resort to this in time often saves the patient's life. Cutaneous edema is treated as usual, supplemented by massage of the lower extremities and bandaging the limbs, beginning at the toes. Torpid action of the kidneys is treated with non-irritating diuretics, energetic heart treatment and counter-irritants over the kidneys. Sleeplessness is often cured by taking a few ounces of beef tea with a little whisky or brandy just before retiring. Opiates must be avoided that exert a depressing effect on the heart, but benefit is derived from chloral and large doses of potassium bromid, morphin, paraldehyde, sulfonal and trional, and even chlorodyn in some cases. One patient has been taking the latter every day for a year with good results and no inconveniences. Pains in the region of the heart are relieved best by nitrite, but also by opiates and local

applications. The same treatment is indicated no matter what the lesion may be to which the enfeebled condition of the heart is due, except when there is reason to suspect that an inflammatory valvular lesion is in an advanced stage with degeneration of the cardiac musculature, in consequence of lesions of the coronal arteries. In this codition extreme circumspection in the use of gymnastics and tonics is required, and the main dependence must be on absolute rest with the administration of arsenic and potassium, the latter, combined or not, with ammonium carbonate. He has never seen unfavorable results follow the administration of digitalis in lesions of the aorta.

PRACTICAL NOTES.

Surgical Treatment of Deafness.—When deafness is due wholly or principally to some disturbance in the transmitting apparatus, it can be cured by an operation, according to Garnault, consisting of the excision of the tympanum, ablation of the hammer and incus and mobilization or extraction of the stapes, performed through the mastoid. Rinna's test allows the cases that would be benefited by the operation to be distinguished from those that would not. Garnault states that every case of the kind in which the cranial perception of the diapason is superior to the aerial perception, should be operated.—*Bulletin de l' Acad. de Méd.*, December 29.

Acute Otitis of the Middle Ear, Complicated with Mastoiditis, Cured with Antistreptococcus Serum.—A girl of 8 was brought to Wodon for treatment, with a temperature of 39.5 to 41 degrees C., pulse 140, intense headaches, insomnia, tendon spasms and agitation, with numerous streptococci in the pus from the ear. Twenty cubic centimeters of antistreptococcus serum were injected in the inside of the thigh and an improvement was evident the next day. The temperature fell; the discharge from the ear gradually diminished and finally ceased; the mastoid region lost its inflamed appearance, and in ten days the child was entirely cured. The disfigurement from trephining was avoided, and as Wodon remarks: "Our conduct is henceforth traced for us."—*Presse Méd.*, from the *Presse Méd. Belge*, No. 44, 1896.

Morphino-Cocain Anesthesia.—Ceci has used a combination of morphin and cocain in 544 cases, and recommends it in high terms as invariably successful. He administers a maximum dose of 2 centigrams of morphin fifteen minutes before operating on adults, and half this amount for children, and cocain at 2 per cent., warmed. Contrary to Reclus' method, he makes deep injections. He considers this method of anesthesia indicated in all cases when the field of operation is not too extensive or vague. He does not use it for children or easily excited, intractable persons. But in operations on the bladder, urethra, foot, leg, etc., it renders especial services, and lasts from thirty to fifty minutes. There are no accidents from its use, merely a dryness of the throat and thirst after maximum doses, with slight psychic excitement.—Reported at the Italian Surgical Congress, *Presse Méd.*, December 19.

Serum Treatment in Chronic Rheumatism.—A curious fact, observed by Cassin, is quoted in the *Journal de Médecine*, August 10, which refers to a case of chronic rheumatism treated by injections of Cheron's serum. The patient was a man, aged 49, who had been suffering from chronic rheumatism since he was 37, all the joints being successively affected, and where no result was obtained by any therapeutic method, arsenic, salicin, etc., proving useless. Cheron's serum was then tried, 5 to 10 c.cm. being injected daily either into the deep muscles of the back or the tissues round the affected joint according to the part affected. The result was surprising, the patient being able to resume the movement of the joints. It would seem that the rheumatic condition continued, but its effects were kept in abeyance by the regular use of the injection.—*British Medical Journal*, December 5.

Etiology of Infective Diseases.—Numerous facts have demonstrated that contagious diseases can originate without contagion. We know that the germs can live normally in various ambient media, the cavities of the human organism included, until some unknown cause rouses them to virulent action. Kelsch states that it should be the task of science to determine the causal circumstances, cosmic, hygienic, telluric or whatever they may be, as much as to determine the germ themselves. All prophylactic measures should aim to improve the media until they become unfavorable for the development of the germs, the cavities of the human organism included, and local and individual hygiene should supplement the preventive isolation, etc., which now constitutes our prophylaxis of infective diseases. His study of the subject is an interesting contribution to epidemiology; it is published in full in the *Bulletin de l' Acad. de Méd.* of December 22.

The Bicycle and the Kidneys.—The *Gaz. degli Osp. e delle Clin.* of December 24, describes some recent investigations of the urine of healthy subjects before and after bicycle riding, which showed in half of the cases such an abundance of albumin and cylinders of various kinds that the diagnosis of acute or chronic parenchymatous nephritis would certainly have been made by any one unacquainted with the circumstances. It is evident that the condition is what Leube designates as physiologic or functional albuminuria, with the difference that Leube and Senator state that there is no traces of cylinders in physiologic albuminuria, while in eight riders examined, members of a bicycle club, tube casts of all kinds were found in abundance in all but two, with more or less albumin in all. Four other riders gave out after an hour and a half or three hours ride, and in two of these the urine was normal; in the other two it was moderately albuminous, with no casts. Five healthy boys also showed albumin in the urine after riding. The writer concludes that the frequent repetition of such experiences can scarcely fail to terminate in chronic nephritis sooner or later.

When to Operate in Appendicitis?—The surgeons now claim this trouble exclusively and do not hesitate to assert that intervention is always necessary to prevent immediate or future dangers. Immediate operation is indicated in diffuse peritonitis from appendicitis as cases have been known to recover with it, and it offers the only chance. Aside from these acute cases, the moment for intervention is, in children as early as possible after the diagnosis has been made. In adults the third or fourth day, during which time medical treatment should be employed, ice, opium, caffein, serum and calomel in fractional doses, with constant surveillance to operate promptly if alarming symptoms occur. If the pus does not issue with gentle manipulations, it is exposing the patient to grave dangers to prolong them. The pus will flow in two or three days if a loose mèche of iodoform gauze is inserted. The appendix is easily removed in children. In adults if it is not visible and can not be felt with the finger, it is not prudent to prolong the search, and the operator should not hesitate to leave the appendix imbedded in its false membranes.—L. Beurnier, *Journal de Méd. de Paris*, December 27.

Electricity in Obstetrics.—O. C. Sudlow announces that he has found faradization useful in promoting delivery, arresting hemorrhage and assisting in the expulsion of the placenta. Its principal effects are: 1, its sedative action, enabling it to take the place of chloroform and chloral; 2, its oxytocic action, hastening parturition by increasing the strength and the effectiveness of the natural uterine contractions; 3, it favors the expulsion of the placenta and arrests uterine hemorrhage. The sedative effect was obtained eight times in twelve and the oxytocic nine times. In twenty cases out of twenty-seven the expulsion of the placenta was materially assisted, and hemorrhage was promptly arrested in three cases out of four. The best abdominal electrode is the hand of the operator, but a flat

sponge covered with a sheet of rubber can be substituted. The positive electrode is placed on the sacro-lumbar region and the negative on the abdomen, or they can be applied on each side of the uterus, with the precaution that the current does not pass through the child's head. The sedative effect is obtained with ten to fifteen minutes of the current, gradually increasing the force until it is felt without pain. When an oxytocic effect is desired, the current should be applied stronger and intermittently, stopping just short of actual pain. To favor the expulsion of the fetus a feeble current should be applied as soon as the child is delivered.—*Presse Méd.* from the *Revue Int. d. Electrothérapie*, August and September, 1896.

The Sound in Diagnosing Renal and Ureteral Calculi.—The symptoms of calculi in the urinary passages are often deceptive, presenting sometimes the picture of intestinal occlusion, etc. But if purgatives are used as indicated for the latter, fatal collapse may be the result. For this reason Kolischer advises using the sound, as the presence of a solid body is easily recognized by its resistance to the instrument. It can also push an imbedded stone along into the pelvis of the kidney as indicated in reflex total anuria. (Hohenegg's case.) It may also possibly reduce the size of the concrement (Casper). Kolischer has also succeeded in causing the descent of the concrement into the bladder three quarters of an hour after injecting 3 grams of vaselin oil through a hollow sound. Injections into the pelvis of the kidney are easily made, but it does not seem practicable to irrigate it. He concludes his review of the subject in the *Wien. klin. Rundschau*, of December 27, by recommending repeated cystoscopy in the lull after an attack to prevent growth of the concrement. Mainzer also has been recommending cystoscopy in the *Berl. klin. Woch.* of December 7, especially for the female. It renders an exact diagnosis of urinary fistulas possible, helping to decide the three questions: 1. Are the ureters intact? 2. Where is the hole in the bladder located? 3. Is there such an opening? Cystoscopy is also valuable in helping to diagnose troubles in neighboring organs, perforated dermoid cysts, extrauterine pregnancy, etc. Landau combines the use of Casper's and Brenner's cystoscopes, after filling the bladder with sterilized water, and dipping the instrument in glycerin.

The Cure and Prevention of Curvature of the Spine in Pott's Disease.—Thirty-seven hunchback children have been relieved of their deformity without danger or serious complications by Dr. Calot, who recommends his method as absolutely without injury to the general health of the child. In the gravest cases he removes the posterior bony wedge that prevents the straightening of the spine. In two cases he was obliged to resect a wedge-shaped piece of the rachis. In the other cases the correction was accomplished by external maneuvers alone, preceded in some cases by the removal of the projecting spinal apophyses. The child is placed on its belly, under chloroform, and the spine is restored to its normal position by means of traction exerted on the ends of the vertebral column, while strong pressure is exerted on the hump at the same time. Two assistants pull at each end of the trunk, while Dr. Calot presses without fear and with all his might on the hump. The two segments of the vertebral column are thrown out of gear and straightened; the hump no longer exists! To maintain the correction a very tight and large circular plaster cast is applied at once, still under chloroform, to the trunk, descending from the head, as far as the pelvis, both inclusive. He ascribes the success of the operation to the care with which this cast is made and applied. The first cast is left three to four months, the second the same length of time, and occasionally a third. At the end of five to ten months there is no trace of the deformity left in most cases, while the health of the child has not suffered in the least. Dr. Calot exhibited several of his cases at a recent meeting of the Paris Académie de Médecine.—From the farewell number of the *Union Médicale.*

Recent Surgery of the Stomach Abroad.—Angerer of Munich has performed twenty-nine operations on the stomach, among them pylorectomy six times (three for cicatricial and three for cancerous stenosis). All died in three weeks except one, who recovered but succumbed to a recurrence of the cancerous affection seventeen months afterward. His twenty-three gastroenterostomies were more successful with the Hacker than the Wolfler method (one recovery in six operations by the latter method and nine in seventeen by Hacker's). Five patients gastroenterostomized for cicatricial stenosis resulted in two recoveries. One died from hemorrhage from a large ulcer in the pylorus and two from shock. The necropsy of one of the latter showed that the stenosis had been produced by the head of the pancreas, which had forced itself into the stomach through a perforation in the posterior wall. The seventeen operated for cancerous stenosis all died (three in one day; four in two; one in five, and the rest in from nineteen days to seven and one-half months). All the patients received liquid food from the very day of the operation, beside rectal alimentation. (*Presse Méd.* from *Munch. med. Woch.*, Nos. 42 to 45, 1896.) We notice that Obalinsky reported at the recent Polish Surgical Congress that he had resected the pylorus and part of the colon on account of cancer, with complete recovery of the patient in ten days. Schnitzler recently performed an exploratory operation on a patient (female, 35) for a tumor of the stomach which could be distinctly palpated, and had been causing great pain and vomiting of blood. When the stomach was exposed it was found in absolutely normal condition, but as he was inspecting it a tumor suddenly formed under his eyes in the pylorus region, 6 to 7 cm. long by 4 to 5 cm. in width, hard and completely obstructing the lumen. It was evidently a hysteric phenomenon or some reflex spasm from an ulcer or erosion of the gastric mucosa. The tumor was opened with a straight incision, but no deviation from the normal was discoverable and the opening was closed with an oblique suture to prevent the recurrence of the muscular contractions. The desired effect was attained, as the patient has been free from her troubles since. A similar "phantom tumor" in the abdomen is described in *Il Morgagni*, No. 10, cured also by an exploratory laparotomy.—*Wien. klin. Rundschau*, December 27.

Hematoma of the Dura Mater.—A very interesting but somewhat mysterious case is published by Dr. Munro in a recent number of the *Glasgow Medical Journal.* The patient was a cooper about 50 years of age, who was admitted to the wards of the Victoria Infirmary in January, 1895. He had been in his ordinary health a few hours before when he suddenly fell down in general convulsions. The siezures followed each other very rapidly, but after a time it was noticed that the convulsion became almost restricted to the right side, although the left leg was still slightly involved. Consciousness was not regained, and on admission it was observed that the mouth drooped to the right. Each fit commenced with conjugate deviation of the eyes and head to the right side, and then tonic, followed by clonic, spasm affected both legs and the right arm. No cardiac lesion was detected and the urine was not examined. The temperature rose to 106.8 degrees F. before death ensued. The condition of the brain found at the necropsy is of much interest. No significant abnormality was found in any other organ. When the dura mater was removed it was found to be lined on the left side by an adventitious membrane about as thick as itself, firm and adherent, although it could be stripped off. It was reddish in color and was not adherent to the pia-arachnoid except in the region of the left olfactory bulb. There was no evidence of hemorrhage to the naked eye and the membrane appeared to be of recent development. It clothed the inner surface of the dura mater, above, below and laterally. It was, however, absent from the left side of the falx and from the superior surface of the tentorium. Microscopic sections showed it to be much less transparent than the

dura mater. It consisted of several layers and its deeper half contained more pigment than the half next the dura mater. The pigment was reddish-yellow and was distributed in round or oval clumps of considerable size within cells. The basis of the membrane was a vascular and cellular fibrous tissue. The dura mater was not abnormally adherent to the bone on the left side. No other intracranial abnormality was discovered. Dr. Munro, in discussing this case, directs especial attention to the occurrence of what was apparently a hematoma of the dura mater in a patient not an inmate of an asylum. It is undoubtedly rare, and that this false membrane was the result of repeated hemorrhages is probably indicated by the fact that it could be easily separated from the dura mater and by the presence of pigment almost certainly derived from the blood, in the membrane. Such a condition has been described in connection with general paralysis of the insane. It has also occurred in infantile scurvy, but we are not aware of any other condition with which it is associated, unless we include a similar if not identical condition in syphilis. There was apparently no recent change in the condition which would account for the status epilepticus leading to the fatal issue.

Benzosol in the Treatment of Intestinal Tuberculosis, Secondary to Pulmonary Phthisis.—Dr. Kofron of Cleveland, in the *American Therapist*, December, outlines the case of a musician, aged 21, whose tuberculous affection appeared to date back two years. For five months, diarrhea with pain in the abdomen, flatulence and tenesmus had progressed so that he had often found it necessary to cancel engagements on this account, and because of the feverishness that came on in the afternoon, lasting until 11 or 12 o'clock at night. In January, 1896, he had a severe hemorrhage from the lungs, losing at least a pint of blood; this recurred in about two weeks, when he lost about two pints of blood, and was obliged to stay in bed for three weeks. After leaving his bed he found that he had lost 30 pounds in weight; was very weak, and was unable to follow his occupation. The annoying diarrhea and severe cough also continued. The physician previously in attendance examined the sputum and stated that tubercle bacilli were numerous. He took a good many creosote capsules, which had but little effect on the diarrhea; each movement was still accompanied with the passage of flatus and some tenesmus. Benzosol was begun in April, in four grain doses every four hours, and continued with apparent results for one week. He reported on May 8th, and thought he was somewhat better, as he did not pass so much gas when his bowels moved, although loose passages still continued. He then ordered benzosol, five grains four times a day, for one week, and after that five times a day; he had to report in about three or four weeks, or if worse to return sooner. He reported June 19, and said that he was getting along well; it had not been necessary to come before. Now his bowels move once or twice a day, and almost a natural movement without pain and very little gas; his appetite was greatly improved and his cough had become less severe, and he expectorated very little; the powders of benzosol four times a day, were continued. In July he was able to resume his work at playing the violin, filling four engagements each week, and stood the work very well. In September, he complained that his bowels were again loose, and wanted to know if he could not take some other medicine instead of the benzosol powders. To satisfy him, and as a control-medication, this remedy was discontinued and an emulsion of cod liver oil was prescribed. He returned October 1, saying that the diarrhea was even worse, as the movements were frequent, and the pain, flatulence and tenesmus had returned. He reported one week later, that he was decidedly worse, his bowels being looser than ever. He was again put upon benzosol, four grains four times a day, Dover's powder, 5 grains at bed time and a strict diet. He reported in October and November that he was again improving, and as well as he was before, being able to fill his musical engagements, with either violin or trombone, every evening, in some weeks. The writer is persuaded that the treatment by benzosol has been the agent effecting the marked improvement in his patient's condition.

Phloridzin Diabetes.—Phloridzin is a crystallizable glucosid obtainable from the bark of the stem and root of the cherry and some other rosaceous trees. That the sugar excreted by the urine after its administration was not derived from the glucose of its molecule was, however, clearly established by two facts, either of which would be sufficient: 1, that the quantity of sugar passed in the urine is far greater than the total amount of phloridzin administered; and 2, the complementary part—phloretin—left after the sugar is removed from the glucosid produces glycosuria. Phloridzin, it was to be remarked, produces a very severe form of glycosuria, the quantity of sugar in the urine being 40 to 50, or 80, or even over 100 per 1,000, according to Dr. Pavy, before the November meeting of the Physiological Society of London, as reported in the *Lancet* for December 26. Phloridzin causes glycosuria whether administered by the mouth, or by subcutaneous or by intravenous injection. When given by the mouth the glycosuria lasts until the next or even until the third day. When administered by subcutaneous injection the effect is produced more quickly, but ceases sooner, the glycosuria frequently being found to have passed away by the next day. This more rapid disappearance of sugar from the urine after subcutaneous injection was a point of importance in interpreting the results of experiments. On the strength of certain experiments by Von Mering it had been asserted that phloridzin produces glycosuria without glycohemia—sugar in the urine without an increase of sugar in the blood. In three experiments made by Von Mering the estimate of the amount of sugar in the blood brought it within the normal range. It was pointed out that Von Mering made use of a mode of analysis attended with the employment of a large quantity (2 liters) of water. Coagulation was effected by heat, and after filtration the filtrate had to be evaporated down to a small bulk before the sugar was estimated by Fehling's solution. In another recent communication to the Physiological Society Dr. Pavy showed that a very large loss was liable to occur when a solution of sugar is subjected to prolonged ebullition. In one experiment in which 0.595 gram of sugar from honey was simply boiled in a flask with a liter of water for twelve hours, the loss amounted to 54 per cent. In another experiment with sugar from diabetic urine the loss was 57 per cent. Again, it was important in order to ensure that all the sugar shall be extracted, to get a coagulum which can be readily and effectively washed. Both requirements are fulfilled by the alcohol process. The experimenter must be alive to the fallacies which lurk in the analytic methods. If he be properly on his guard against these, very accurate results might be obtained. Thus, in a series of experiments brought to the notice of the Society, sugar was added to the blood in known quantities and afterward estimated. The error never exceeded 5.5 per cent. and was usually much less. In addition to the fallacies connected with the mode of analysis, there were others connected with the circumstances as regards the state of the animal at the time of collection and the manner in which the collection was made which must be guarded against. Both chloroform and ether led to the presence of an abnormally large amount of sugar in the blood. This, unless taken into account, would form a seriously vitiating factor. Speaking of some experiments of Levene on phloridzin glycosuria it was pointed out that he had neglected to give consideration to this source of fallacy, and that he had also delayed taking the blood supposed to be under the influence of the subcutaneous injection of phloridzin till the following day, when the opportunity was given for the effect of the drug to have passed away. Guarding against the various sources of fallacy enumerated, Dr. Pavy, experimenting on the cat, subcutaneously injected 0.5 gram of phloridzin and examined the blood and urine taken at times of killing from one to five hours afterward. The table of results placed before the Society showed that sugar was found to be present in abnormal amount in the blood, and that, therefore, it was not correct to say that there is no glycohemia in connection with phloridzin glycosuria. As in other cases where sugar is found in increased amount in the blood, the amylose carbohydrate obtainable from the blood coagulum presented itself in notably larger quantity than usual.

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SATURDAY, FEBRUARY 6, 1897.

SACREDNESS OF PROFESSIONAL CONFIDENCE.

The Playfair violation of professional confidence met with practically unanimous condemnation by the medical profession, which therein but reiterated ethics it had taught for more than twenty centuries. Nearly seven decades ago, the American medical profession viewed with equal severity a similar breach of confidence by DELPECH, although there were much greater extenuating circumstances and although he was assassinated therefor. The *Medical Magazine* (March, 1833, published at Boston) remarked anent the assassination of DELPECH:

"This tragical event while it cost the profession a most distinguished member, has also left an impressive admonition on a point which can not be too strongly addressed to the awakened attention of medical advisers. M. DELPECH was a victim to an atrocious act of professional infidelity and without attempting to justify the deed in the agent of it we are free to declare our opinion that, as a retribution on the offender it is most just and salutary.

It is essential to the value and the responsibility of the medical profession that the intercourse between the physician and his patient should be strictly confidential and no penalty can be too severe for a violation of it. The physicians first, and as we maintain, his paramount duty is to his patients. So deeply is the whole community interested in the inviolability of his professional fidelity that while on the one hand neither courtesy, friendship nor bribery should tempt him to communicate any matter which his patient may confide to him as a physician, society is bound on the other to protect him from any attempt to extort them under the forms of legal proceeding.

This point of honor and duty is well understood and, as we believe, rarely if ever violated of intentionally by the physician of our community; but there is an undignified and mischievous kind of tattle in which some gentlemen indulge generally for the purpose of magnifying their own business or skill, that is always liable to run into disclosures which are not intended by them at the outset nor even perceived at the time. Such talk is always an offence against good taste and indicates a mind not only destitute of materials for valuable conversation, but too regardless of the obligations incurred by confidence reposed.

The homicide had been a patient of DELPECH some time before. He was treated for varicocele. The case was attended with circumstances that rendered it imprudent for him to form a matrimonial engagement. DELPECH having been consulted by the family into which the patient wished to marry, gave them some intimation of his patient's condition. The patient met DELPECH at the theater the night before the fatal deed and demanded a retraction of what had been said to the family. This was refused. The assassin stationed himself in the balcony of a house and watched the approach of DELPECH'S cab, when with one shot from a double-barreled gun he killed the servant and with the other DELPECH. He then retired into the house and blew out his brains with a pistol. DELPECH expired in a few minutes. He was in his 60th year. He was a chevalier of the Legion of Honor, professor of clinical surgery in the University of Montpellier and surgeon-in-chief to the principal hospital.

The mental status of the homicide was doubtful. Victims of varicocele are but too apt to have as a result suspicional mental states which are a fruitful source of baseless jealousy and ideas of marital infidelty. DELPECH however in revealing the patient's physical condition went beyond his duty as a physician and violated the French civil code. Censure by the *Medical Magazine* of the results of medical gossip is as valid now as it was seven decades ago.

THE LEGISLATIVE CONTROL OF VIVISECTION.

We again call attention to the question of vivisection, which has been given especial prominence during the past year by an organized attempt to limit by legislation, and thus virtually prevent, the useful pursuance of this valuable procedure in experimental physiology and therapeutics.

In order indirectly to gain national condemnation of vivisection, the District of Columbia was chosen as the ground for action, and a measure to this effect was introduced into the United States Senate, entitled "A bill for the further prevention of cruelty to animals in the District of Columbia." This attempt to enforce legislative control of vivisection was accompanied by documentary evidence so replete with misstatements, distorted statistics and unreliable opinions, that the casual lay-observer would at first sight believe that a great system of cruelty was in vogue in the scientific and educational institutions of this country.

Happily for the best interests of the nation, a vigorous resistance has been offered to the passage of

this bill. A joint committee from the various medical and other scientific societies and educational institutions of the District of Columbia was appointed to prepare a memorial to refute the allegations and show the erroneous statements made in advocacy of the bill, and in behalf of those truly interested in the relief of suffering humanity, to protest against the proposed legislation. The result of the work of the joint committee is published in Document No. 31, issued from the Senate during the second session of the 54th Congress; and no one can gainsay that they have dispassionately and effectually accomplished their mission.

The committee verify their statement that no amount of "patient research" or "experience," without experiments on living animals, could possibly have secured the same results as have been obtained by the application of the experimental method to biologic problems, by carefully enumerating the numerous discoveries directly due to methods analogous to vivisection. Starting with the investigations of DAVAINE in 1850 proving the anthrax bacillus to be the cause of the infectious disease known as anthrax, the progress is reviewed down to the most recent research in immunization and serum therapy. These facts are well known to the medical profession, as are also the hundred of physiologic truths, discovered by vivisection. They can not be denied.

Not only humanity, but also the lower animals have been benefited by the very methods which the "cruelty-to-animals" fanatics seek to suppress. Means have been developed to prevent infectious diseases in our beloved domestic animals. The ravages of sporadic pneumonia, tuberculosis, glanders, anthrax, hog cholera and many other animal-diseases are fast diminishing in civilized communities. As a result of Congressional legislation and appropriation for instituting methods believed to be suitable for the eradication of contagious pleuro-pneumonia, every trace of this disease was removed from the United States within a brief period of less than six years, and at a cost ($1,509,100.72) that was trifling in comparison with losses likely to occur annually as soon as the disease had obtained a foothold among the cattle on the Western plains. There is promise of a similar result in infectious swine-diseases, from which, according to Dr. SALMON, the loss has been from $10,000,000 to $25,000,000 annually. In 1894 CHAMBERLAND reported that a total of 1,988,677 animals had been inoculated in France, and the loss from anthrax had diminished from 10 per cent. in sheep and 5 per cent. in cattle to less than 1 per cent. in sheep and one-fourth of 1 per cent. in cattle, a saving of over $2,000,000.

Let the friends of the animal and the antivivisectionists ponder over these facts and carefully consider the whole question before they rush headlong in their ardor to prevent cruelty and suppress the very methods that will render the condition of the domestic animal more comfortable. The humanitarian, the scientist, and the economist are working toward a common end, and narrow-minded bickering and selfish reasoning can never prevail. We do not say that there never have been abuses, but we believe that they have generally been in the hands of private experimenters. We feel sure that the laboratories of our scientific institutions will always permit unlimited inspection of their methods. Secrecy can only serve to increase the antipathy of the opponents of vivisection.

There is no doubt that the majority of persons capable of expressing an unbiased opinion are overwhelmingly opposed to the legislative restriction of vivisection. Sixty-eight medical and scientific associations from all over the country, and including the most liberal-minded and humane men of the day, have adopted resolutions to this effect.

With the joint committee we unhesitatingly affirm that,[1] "The voice of science and medicine, so far as it receives authoritative utterance, is overwhelmingly opposed to legislation of any kind which would take in any measure the direction of experimental medicine and physiology out of the hands of those who, on account of their special fitness, have been chosen by the authorities of our higher institutions of learning and of research to convey instruction and to conduct investigations in these departments. Unnecessary and offensive in the highest degree would it be by any system of official inspection, such as that proposed in this bill and which might readily be used as a system of outrageous espionage, or by legislation of any kind, to attempt to dictate or control how and by whom, and for what purposes, and under what conditions, and upon what animals in the laboratories and the institutions of the higher learning, experiments shall be made. The decision as to these matters should be left wholly to those in charge of these institutions, who are the ones most competent to judge of them."

"BUSINESS" METHODS OF QUACKS.

One perennial newspaper jeremiad bewails the alleged lack of "business" ability on the part of the regular profession as contrasted with the redundant "business skill" of the quack. These quack "business" men have shown of late tendencies to "business" of a type which is usually rewarded, in ordinary mortals, by a sojourn in a penitentiary. One Chicago institution, incorporated under a most alluring title, placed advertisements in all the Chicago dailies, for which it paid. It thereupon proceeded to insert in country newspapers similar advertisements on credit, for which it gave the Chicago dailies as reference. The newspapers, in country and city, fulsomely lauded the skill of the advertisers. The bills for country advertise-

[1] Quoted from the Memorial of the Association of American Physicians.

ments not having been paid, inquiry was made which resulted in the discovery that the concern first incorporated had sold out to its own members incorporated under another title. The United States postoffice authorities thereupon arrested the members of the last corporation for misuse of the mails. Such changes of title have long shielded the quack against malpractice and other suits. It is to be hoped that the United States authorities will succeed in putting a check on these procedures. The credulity of the press in the present instance is closely akin to that gullibility arising from blunted moral sense which makes countrymen such ready victims of the seller of counterfeit money. An Indianapolis instance of similar "business" skill seems to indicate the necessity for an examination by the United States comptroller of the currency, of an Indiana national bank. Among the old dodges of quacks is the "no cure no pay" guarantee concerning which CRABBE ("The Borough") years ago sang:

> But now our quacks are gamesters, and they play
> With craft and skill to ruin and betray;
> With monstrous promise they delight the mind,
> And thrive on all that tortures humankind,
> Void of all honor, avaricious, rash,
> And twenty names of cobblers turned to squires
> Aid the bold language of the blushless liars;
> And then in many a paper through the year
> Must cures and cases, oaths and proofs appear,
> Men snatched from graves as they were dropping in.

From time immemorial "no cure no pay" guarantees have turned up as judgment notes. MENECRATES the charlatan (B. C. 300) had such guarantees for "sacred" (incurable) diseases. These were usually the so-called "nervous diseases" of the advertising quacks, and of course included an enormous number of cases of hypochondriasis. According to ATHENÆUS ("Banquet of Savants") MENECRATES signed a written "no cure no pay" guarantee with these "incurables," who found they had engaged themselves to serve as slaves after being cured. MENECRATES sometimes renamed them with a cognomen of the Grecian gods and took them with him in a species of temple chariot. He called himself Jupiter (WITKOSKI: "Le Mal qu'on Dit des Medecins"), wore a purple robe, a crown of gold upon his head and a scepter in his hand, and paraded about with his conclave of spurious divinities. He once wrote to PHILIP, King of Macedon, as follows:

> MENECRATES Jupiter to King PHILIP, greeting. Thou art King of Macedon and I am King of Medicine. Thou canst make men in health perish when thou desirest. I can save the sick, guarantee to cure all diseases up to the extremity of old age. Those who are well, if they follow my orders, live forever. If thou hast soldiers to guard thy person and life, I have for protectors those I have snatched from the jaws of death. For it is I, Jupiter, who giveth life.

King PHILIP responded in fitting terms:

> PHILIP to MENECRATES, greeting and better sense. Go to Anticyra and drink hellebore for thy brain.

MENECRATES wrote in about the same terms to ARCHIDAMUS, King of Sparta, and other rulers, always employing his self-given title, Jupiter.

PHILIP one day invited this quack to dinner together with his retinue of so-called "gods." The quack was placed upon a throne ornamented in the greatest magnificence and with all the mock ceremony possible. A table was placed before him on which were all the first fruits of the season and delicious cooked meats, but these were served only to the King's convivial companions who were in the joke; the servants merely allowed MENECRATES and his troupe of "gods" the odors from empty cups used in libations. Jupiter MENECRATES, finding himself the laughing-stock of the company, flew away from the repast with his "gods."

Despite this early exposure of the "no cure no pay" dodge, it still flourishes in full luxuriance. A most outrageous case of this kind lately occurred in Indianapolis. It throws light alike on the source whence many quacks obtain capital and on the lack of care with which certain banks give discount. Suits have just been filed against an Indianapolis medical institute and a local national bank to recover $300,000 obtained from residents of the Mississippi Valley through the "no cure no pay" dodge. The "institute" claimed to be an Indiana corporation with a well organized hospital having a staff of consulting specialists. Agents of this institute gave guarantees all over the Valley that it would cure all chronic diseases. These guarantees were purchased and discounted as notes by the bank to the amount stated. As in many instances the diseases, for the cure of which a guarantee was given, were of a kind that the patient shrank from being exposed to public view; hundreds of dollars were paid on these notes. Aside from these $300,000 was obtained on guarantees which would bear inspection, and for this amount suit has lately been brought. Against such "business" methods the medical profession has made that protest for thousands of years which first found formal expression in the Hippocratian oath and later in the Code of Ethics of the AMERICAN MEDICAL ASSOCIATION. It certainly will not abandon its ethical principles at this late day at the behest of sensation-mongers for antique confidence operations of the type described.

MINING FATALITIES.

During the year 1896 there were 497 men killed in the coal regions of Pennsylvania. This last annual contribution to the mortality record shows the awful regularity with which the destruction of life among miners proceeds. The total number of outright deaths for the past three years was 1,327. In addition 4,780 miners were maimed, many so seriously as to be incapacitated for future work. As a consequence of these sad happenings, 633 women were left widows and 1,752 children became orphans, and in nearly

every case were dependent on poor-boards and charity-organizations for their future sustenance. The compensation of coal miners is wofully small in view of their obnoxious and hazardous occupation. Few of them are able to save any money; and their only hope lies in mutual relief-organizations, and among the penurious aliens, even these are sometimes disregarded.

It is only when some terrible catastrophe like the tragic Twin Shaft disaster occurs, that the fearful accident-mortality among miners is brought to public view, and measures for relief advocated. Such events soon pass out of mind, and agitation for reform subsides; but the grim hand of Death goes on unmolested. Despite the laws for systematic inspection and improved means of ventilation, there seems to be no diminution in the death rate.

According to a writer in the New York *Herald*, Mr. WILLIAM CONNELL, a recently elected member of Congress from the Lackawanna district, and one of the largest individual operators in the region, expressed himself in favor of a tonnage tax to maintain a fund for the helpless and poverty-stricken families, whose fathers have yielded up their lives to the insatiable greed of the unscrupulous mine-owners.

This proposition seems to ameliorate the effect, but leaves untouched the cause. To the mine-owner it is simply an extra price paid for the human life sacrificed; and moreover the increased expenditure in mining will be compensated for in some other way. Either the miner or the consumer will indirectly pay the tax, and the mine-owner will sit in his office and still count the plentiful proceeds of his deadly operation.

If the money expended for miners' hospitals and relief funds could be paid outright for the preservation of the necessary life-preserving pillars that are now ruthlessly undermined, these calamities would soon cease, and the actual money saved, outside of the value of the lives preserved (for each life has a definite money value), would far overbalance the worth of the paltry tons of coal, the mining of which is the root of the evil.

The only sensible manner for a legislature to proceed in these cases is to destroy the cause, by passing laws requiring rigid mine-inspection, and appropriating a sufficient sum of money to render these laws fully operative. Make a life-tenure of office for the mine-inspectors, and fix the salaries sufficiently large to induce capable and conscientious men to accept the positions. The capitalists would howl and the lobbyists bribe; but a few years of persistent agitation would convince the legislators, and we would witness the triumph of humanity over political trickery and mercenary greed.

THE DOMESTIC ANIMALS AND CONTAGIOUS DISEASES.

The fact stated in the public press that the bubonic plague now devastating Bombay and threatening Europe largely owes its extension to that household vermin, the rat, is significant enough to suggest some serious considerations.

Various animals, in their domestication, have been and are recognized as agents of contagion, though the extent of the danger has been, as usual, both underestimated and exaggerated, according to the special circumstances of the time. Ordinarily no one troubles himself as to the dangers of hydrophobia, but at certain seasons of the year there is almost an annual massacre of the innocents for the fear of this rather rare and, possibly in many cases, somewhat questionable disorder. Then the public returns to its old equanimity and the affectionate brutes slobber over their human friends and whilom foes with impunity. The danger of this practice seldom seems to suggest itself to zoophiles and yet it is a very possible and probable one when certain diseases are prevalent. Even if the animals themselves are immune to certain diseases the chance of their conveying the contagion in their hairy coats constitutes a danger to be considered, and renders caution advisable. Dogs have been said to carry scarlatinal infection, cats and fowls are claimed to be especially liable to diphtheritic disease which is directly communicable to man, and rather recently a particularly fatal infection has been traced to parrots so often kept as domestic pets, and its bacillus has been isolated by a French physician, M. NOCARD. It has been found to be pathogenic to many other domestic animals, and they, it is probable, can also transmit the disease. It appears to be not at all rare in parrots, in France at least, and is very readily transmissible to the human species, in whom it is very fatal. It is suggested that by this infection a number of hitherto unaccountable local epidemics can be explained.

The moral of all this is, not that we should encourage any unreasonable fears of the domestic animals, they are generally harmless enough, but that physicians should cultivate a habit of observation of their condition and health as involving that of their masters. In times of epidemics of diphtheria and scarlet fever a dog or cat with prominent social instincts should be at least under surveillance as a domestic pet, and it is desirable in any event to use precautions against such animals undergoing exposure to diseases which they can themselves transmit. A little attention to this particular line of observation may aid also in the detection of the origin of many isolated cases of disease that are otherwise not easily accounted for. In fact it is a not unworthy function of the physician and sanitarian to attend more than is perhaps done at the present to the health conditions in the lower animals, more especially those that have generally escaped this supervision, the dogs, cats, fowls, and even the semi-domesticated vermin, the rats and mice

in certain cases, with special reference to the welfare of his human clientele. This is not a particularly new recommendation, it has been made before, but it is one the repetition of which is occasionally timely.

THE PLAGUE TO BE INVESTIGATED.

We notice by a syndicate letter in the daily press (we have not seen it in any medical journal) that Dr. WALTER WYMAN, Supervising Surgeon-General of the Marine-Hospital Service of the United States, has put his powerful mind on a "special study of the bubonic plague," and that we will very shortly hear something in the way of some important discovery which will electrify the scientific world. We know that this must be so, for the female correspondent who filled two or three columns of the syndicate letter has solemnly assured us that this is a fact. If the veracious correspondent had informed us that Dr. KINYOUN of the laboratory was about to develop something it might have been credited in scientific circles, but if any human being ever heard of the much advertised WYMAN in any scientific capacity it would be a pleasant surprise to know of it. In the meantime, Germany has sent Prof. KOCH to Bombay to study the plague where it exists. Kitasato, when he discovered the microbe of the plague, discovered it in China, where the disease was prevailing; YERSIN, when he confirmed it, did so in the field of its ravages; but the American method of investigating diseases at long range is of recent invention and seems to be confined in its application to the head of the Marine-Hospital Service, who cleverly confronts an epidemic by gazing at the dispatches through the bottom of his glass at a "high tea," and giving the results of his highly original investigations to the admiring society reporter. Great are the results produced by the proper distribution of the products of the Washington florists; and tremendous the effects brought about by careful attention to the social functions of the Capital!

The code of morals which prevents country practitioners and obscure members of the profession in the city from advertising, does not seem to invade the sacred precincts, nor penetrate that luminous halo which surrounds the bureau officer at Washington, and in consequence we have syndicate letters galore, as a rule written a few weeks before the incoming of a new administration.

CORRESPONDENCE.

"Chloroform and Ether."

FREEPORT, ILL., Jan. 17, 1897.

To the Editor:—In the JOURNAL of January 2 Dr. Galloway publishes a communication with the above title, in which he criticises an article of mine that I read last September before the Mississippi Valley Medical Society and which was published in this JOURNAL a few weeks ago.

When I sent out my questions contained in that paper unfortunately many prominent surgeons of the eastern cities were away on their vacations and their answers came too late to be embodied in that article. Later, however, I received many replies, some of them quite lengthy, including replies from such men as McBurney and Bangs of New York, and these men without an exception prefer ether to chloroform as a general anesthetic, because they consider the former immensely safer than the latter.

Nearly all of them give chloroform in exceptional cases, which they distinctly specify.

The words in italics which the Doctor quotes from my paper are the words used, not by me, but by the most eminent men on our continent, who were kind enough to answer my questions, knowing they would be put on record as holding the views they expressed. The Doctor concludes from the tenor of my paper that: "Any student, laborer, messenger boy or member of the patient's family may safely give ether, but chloroform requires a careful and experienced man, therefore he concludes chloroform should not be given."

I have only one answer to make to this quotation, that is, that there is nothing in my paper to warrant any such interpretation of its contents, and I will wager that of the thousands of readers who have read my paper, Dr. Galloway is probably the only man who so misinterprets its meaning. On the contrary I hold that all general anesthesia is accompanied by a certain amount of danger, and I prefer ether to chloroform because the latter is the far more dangerous agent of the two.

I believe with Dr. Penrose of Philadelphia, whom I quote, that the best man among those present to assist at any operation should be generally chosen to give the anesthetic.

Apropos of this subject, I had a little episode in my practice a few years ago that came near resulting in the death of a patient of mine, in whose case I intrusted the giving of the anesthetic to a lady friend who happened to be present. It was a case of secondary hemorrhage following a bone operation on the tibia. The patient had not lost a very large quantity of blood, and her condition was fairly good, but as she was extremely nervous I concluded to anesthetize he before attempting to arrest the bleeding. I had both ether and chloroform in my satchel, but I chose the latter, and why? Simply because it was so easy to give, and acts with such wonderful rapidity. I poured about a drachm of this liquid on a folded napkin, and in three minutes my patient was in a condition of complete insensibility. I now poured about another drachm on the cloth and showed my lady assistant how far from the patient's face she should hold it. I then rapidly opened up the wound and found three small arteries spurting; I put the forceps on the largest of these, ligated it, and when I looked for the others all bleeding had ceased. I turned to examine the patient and found her face was as pale as if dead. Her respiration had ceased and no pulse was perceptible at the wrist; the only sign of life still remaining being a feeble contraction of the heart at long intervals. I had no one present to assist me, save two women, and no time to lose in loading a hypodermic syringe with heart stimulants. I stood my patient on her head, used artificial respiration, dilated the sphincter ani, and in fact worked with the desperation of a drowning man for twenty minutes before my patient showed the least signs of returning animation. I shall remember the terrible agony of that half hour as long as I live, and would not repeat it again for a small fortune. Had that patient died I should have always blamed myself for not putting on a tourniquet as a temporary expedient and sending for a physician to assist me.

In this case, however, if I had been a little more thoughtful, a little less careless, a little less lazy and used the safer anesthetic I sincerely believe I should not have had the terrible experience I had in this case. However this may be, it taught me a valuable lesson which I shall heed for all future time, and that is not to trust the administration of an anesthetic of any kind, whether ether or chloroform, to "lady friends,

laborers or messenger boys," or any one else, except the best physician whose services I can get.

My only variation from this rule is in cases of child birth, where, by the way, I generally use chloroform, believing it to be safer in this class of cases than any other.

I take a napkin large enough to fill a common tumbler about half full, when well packed in. I drop chloroform on this napkin in about drachm quantities at a time, and the irregularities of the patient's face render it impossible for my lady assistants to shut out entirely atmospheric air, should she hold the glass down close over the patient's nose and mouth. If I am using forceps I only use traction on my instrument for a minute or a two at a time, and in the intervals I scrutinize carefully the action of my anesthetic upon my patient. If I am performing version, that is a procedure which is soon ended and I can anesthetize my patient before I begin, and insensibility will continue long enough to finish the operation.

I quite agree with Dr. Galloway on the great importance of having a proper man as an anesthetizer, and believe with him further, that many of the untoward events that follow the major surgical operations are the result of an improperly administered anesthetic.

The only place where I have seen anesthetics given by men who did nothing else is in the hospitals of London, and they generally begin the anesthesia with nitro-oxid gas, and follow it immediately with ether. My experience, however, which is considerable, has led me to believe that men who are so chary of human life as to go to the expense and trouble of employing no one but a professional anesthetizer never employ a man who gives chloroform. There may be exceptions to this rule but if they exist I have never seen them.

Besides I quite agree with the Doctor that he has been treated in a most penurious manner by those to whom he has administered an anesthetic, and if he would only adopt an anesthetic that is, if figures and statistics are worth anything, from five to twenty-five times as safe as the one he uses, he, if skilled in its use, would be able to give a new record to some of the great operators who are now so fond of giving us their statistics, for I believe, Dr. Galloway, your position is often one of greater responsibility and more onerous than that of the man who wields the scalpel. W. S. CALDWELL, M.D.

The Rubber Nipple on the Infant's Bottle.

BELOIT, WIS., Jan. 30, 1897.

To the Editor:—In your Editorial in today's JOURNAL on "Sanitary Trivialities" as a commendation of Dr. Ernest Wende of Buffalo for securing an ordinance prohibiting the use of rubber tubes on nursing bottles. At the last meeting of the Wisconsin State Medical Society I called attention to this crime (as it really is a crime), as follows: "The first thing a new father does when he finds the mother has no milk, is to go to the drug store for a nursing bottle. For some unknown reason the druggist is nearly always sure to give him one of these abominations, with a tube six inches long and a brush with which to wipe it out. I have often wished the druggists and manufacturers could take their food for life through such tubes. Somebody spoke about sterilizing bottles; but you can not sterilize these tubes, and the tubes are nearly always sold. If proper, I would like to make a motion that this society condemn most emphatically all these tubes, and that nothing but a pure nipple be used."

Dr. C. F. Dougherty of Muscoda, Wis., then said: "I am an advocate of common sense ounce bottle and nipple, but no rubber tube, because I think the milk can be more contaminated with germs through the long rubber tube than where they are not used, and I second the motion."

Several members spoke against this form of nursing bottle, but the discussion was ruled as out of order and the motion was laid on the table, though Dr. Dougherty earnestly protested and said that "to lay this motion on the table would result in laying many babies on the table in a coffin."

For the past three years I have carefully watched my cases of cholera infantum and acute milk infections, etc., and every case has occurred in bottle-fed children, *and in children using these long tubes.*

In our later days of asepsis and cleanliness it seems criminal to permit the sale of long hose nursing bottles, for it literally causes a "slaughter of the innocents." All honor to Dr. Wende for his course! Yours truly,

ERNEST C. HELM, M.D.

Testimonials.

NASHVILLE, TENN., Dec. 18, 1896.

To the Editor:—As an editor you must be a very wise man, and as a wise man you must be possessed of all knowledge, therefore I write to you for information. I have just finished reading a neatly gotten up little pamphlet, a reprint from an article that lately appeared in one of the New York journals, sent me by the firm whose widely advertised tissue-former it advocates, and written by a "professor of anatomy and histology," with the title "F.S.S.C., London, etc.," and he hails from a place that would almost touch a line drawn between Chicago and here. "In Bright's disease," he says, "the administration of ——— will often temporarily increase the number of casts in the urine, but it must be remembered that Bright's disease is not in itself the disease, but the result of albuminous deposits in the kidney resulting in ulcerations. A moderate use of ———, however, has in most instances even controlled the ulceration."

Do you think, Mr. Editor, that he came over here from England because they would not allow him to stay in that country any longer, or is this the latest pathology from London, with Dr. "F.S.S.C." right up to date and I away behind?

Yours very truly, ERNEST B. SANGREE, M.D.

About Diploma Mills.

BENTON HARBOR, MICH., Jan. 22, 1897.

To the Editor:—I understand the charter of the Illinois Health University has been annulled, but you will see that the same J. Armstrong, Mary E. Sellers, Demuheller & Co. are in another "mill" of the same sort, and have supplied their graduates here with diplomas from the "Independent Medical College," which is run on exactly the same rules as their other "mill."

It seems that your State officers will allow this same company of confidence men to carry on their nefarious business regardless of anything or anybody; in fact it appears as though they were aids and abettors in their transactions. What can be done about it? Very respectfully,

W. RYNO, M.D.

Reviewers.

MINNEAPOLIS, Jan. 22, 1897.

To the Editor:—Permit me to thank you for your editorial on "The Reviewing of Medical Publications" in the Jan. 16, 1897, number of the JOURNAL. It is not long ago that I put upon the market a text-book (Outlines of Materia Medica and Pharmacology). It had its weak points and no one would recognize these facts sooner than the author. One reviewer dwelt upon a typographic error in the spelling of one word, that was, however, properly spelled in many places throughout the book. In this same review the book was severely criticised because of its weakness in therapeutics when the preface distinctly stated that it was *not* a work on therapeutics.

Another reviewer who signed himself "R. W. W." and who is the American editor of an English work on materia medica, made the most vicious criticisms. At the same time they dis-

played ignorance and injustice on their part. The book was open to criticism but not the kind of criticism it got. Very truly, H. M. BRACKEN, M.D.

Advertising.

January 20, 1897.

To the Editor:—It has for some time appeared to me that a few otherwise reputable physicians in the community in which I reside, have been guilty of flagrant wrongs in the way of allowing their names to be placed about in an advertising manner. The matter of which I have complained has been mentioned to some members of the profession and a few of them take the position that I am not correct. An expression on these points from the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION would be appreciated. The matters to which I wish to direct your attention are, the placing of physicians' names and addresses on large placards to be hung up in hotel rotundas and other public places, page advertisements in city directories of private infirmaries for the treatment of diseases of a certain class, physicians' names on a piece of glass to fit on the telephone box, and the sending of notices of a physician's removal of his office to families on whom he has never practiced. As before stated, I have contended that these instances are palpable and gross violations of the spirit of the Code of Ethics. Please give your reply through the JOURNAL. M. D.

ANSWER:—Your own ideas relative to such conduct, as quoted in your query, are correct. Such things are frequently done in thoughtlessness, but more commonly are the result of a desire to obtain notoriety. Upon nothing is the Code so explicit as this. "It is derogatory to the dignity of the profession to resort to handbills, private cards or public advertisements, inviting the attention of individuals affected with particular diseases, publicly offering advice, etc." The methods mentioned are certainly equivalent to public handbills, etc. Skilled and reputable physicians do not need these methods to obtain practice, and others are better without it when they are compelled to resort to such schemes; or rather the profession would be better without them. (See Code, page 9, section 4.) Recently such an advertisement was observed by a prominent layman, who estimated the author of it justly as "One not possessing the requisite skill to obtain the confidence of the community." The sending of one's card, or notice of removal, to families on whom they have never practiced is very improper, a true bidding for practice.

PUBLIC HEALTH.

Smallpox in Germany Chiefly Imported.—Smallpox in Germany destroyed 65,000 lives per year a century ago. Now the average number is 114 per annum, and most of these are immigrants from those countries "over the border," where less stringent laws regarding compulsory vaccination exist.

Experimental Tests of Preventive Inoculation of Cholera.—Some interesting experiments have been made in Berlin recently with the results that inoculation of seventeen healthy men, most of them physicians whose names are well known to science, a guarantee of the accuracy of the observations, confirmed in every respect the results obtained by Dr. Haffkine in India. The experiments were carefully studied with control tests, and are described in the *Deutsche med. Woch.* of January 1. They show that the effect of inoculation lasts a year, and therefore if a cholera epidemic should gain foothold in any country, it could be stamped out by this means. It also refutes the objections raised by some physicians in India to Dr. Haffkine's work, which was described in this JOURNAL, Dec. 5, 1896.

Length of Period of Contagion.—According to the circular recently sent to the principals of all the educational establishments in France, the period of isolation after smallpox, scarlet fever and diphtheria must be forty days after the first day of invasion, sixteen days after chickenpox, measles and mumps, while after whooping cough attendance at school should not be allowed until thirty days after the coughing spells have entirely disappeared. Tuberculosis is added to the list of contagious diseases, and the principals are instructed to inform the parents if a pupil's bronchitis, enteritis, etc., persists after a certain length of time, as hygienic measures are required in these cases, life in the open air, etc., impossible to secure in educational establishments, where the crowded rooms, etc., are distinctly injurious to the patient, while exposing others to contagion.

New Rules in Pennsylvania Regarding the Contagious Dead.—At a recent meeting of the State Board of Health of that State, Dr. Lee secured the adoption of the following new regulation: When a body, dead of a contagious disease, is to be disinterred, the following precautions shall be strictly observed: "1. No one shall be present at the disinterment except those necessary to perform the labor and one adult male relative of the deceased. 2. A hermetically sealed zinc-lined box, sufficiently large to contain the box, coffin or casket already in the grave, shall be in readiness to receive the latter. 3. When within six inches of the top of receptacle containing the body, the earth shall be saturated with one-fifth per cent. solution (1–500) of bichlorid of mercury. 4. The receptacle containing the remains shall on no account be opened, but shall be at once placed in the box provided as above and hermetically sealed, and said box shall not be opened on arriving at the place of destination." This was adopted.

Good Results from Antidiphtherial Serum in Vienna.—Professor Paltauf of Vienna reports upon a year's experience with the *heilserum*. In 1,100 cases of diphtheria in various parts of Austria treated by antitoxin, 970 recoveries took place, a mortality of 12.5 per cent. The report furnishes strong evidence as to the great value of the treatment in the diminished mortality, and also when it shows that the earlier the treatment is used the more effective is its action. In the cases where the injections were used as early as the second day of the disease, the mortality was 6.7 per cent., while in cases first treated on the third day it amounted to 19 per cent., and those treated on the fourth day to 24 per cent. On and after the sixth day it was upward of 33 per cent. When it is remembered that in previous years the mortality seldom was under 40 per cent. it is clear that we have in the antitoxin a measure exceeding all others in usefulness.

Anti-expectoration Regulations at Brooklyn and Boston.—In the spring of last year the presidents of all the surface and elevated railways of Brooklyn were notified by the Commissioner of Health to conspicuously post in all passenger cars a notice reading as follows: "Spitting on the floors of public conveyances is a public nuisance and a source of danger to the public health. It is hereby prohibited. So ordered by the Commissioner of Health." The employes of each company were required to enforce that order. As certain of the roads had not fully carried out that regulation, on Jan. 25, 1897, a peremptory notification to their officials was issued. The following notice has, by order of the Boston Board of Health, been posted in all the cars of the West End Street Railway Company, Boston: "The Board of Health adjudges that the deposit of sputum in the streetcars is a public nuisance, source of filth and cause of sickness, and hereby orders that spitting on the floors of streetcars be, and hereby is, forbidden." Above this order is posted a copy of the statute stating that the fine for infringement of an order of the Board of Health is $100. The Chicago Health Department has issued a similar notice.

The Quarantine Board of Pennsylvania.—The third annual report shows an increase of work and efficiency on the part of this commission. The constitution of the Board is now as follows: Richard A. Cleeman, M.D., president, appointed by the College of Physicians of Philadelphia; Benjamin Lee, M.D., secretary, ex-officio member, as secretary of the State Board of Health; Henry C. Boenning, M.D., quarantine physician, appointed by the Governor; Thomas Winsmore, appointed by the president of the Philadelphia Maritime Exchange; Theodore B. Stulb, ex-officio member, as health officer of Philadelphia; Henry M. Dubois, appointed by the Mayor of Philadelphia, and Ernest Laplace, M.D., appointed by the Governor—four out of the seven being physicians. The executive officer of the station is the quarantine physician, Dr. Henry C. Boenning. The deputy physicians residing at the station are Dr. Alfred R. Seymour and Dr. J. B. M. Ward. The Board's function for the present is one of observation or "inspection" only, there being no provision for detention or disinfection. If sickness of a communicable nature is discovered on a vessel, or if circumstances lead to the suspicion that the vessel is herself infected, she is simply remanded to the Federal quarantine down the Bay. The Chief Executive of the State, however, may at any time, if in his judgment the public welfare requires such action, reëstablish a fully equipped quarantine station with modern appliances for disinfection, hospitals and barracks. The new station, twenty miles below Philadelphia, is upon leased property in the old borough of Marcus Hook. The leased steam-tug by means of which the boarding of vessels is done is unsuitable; a new boat should be built expressly fitted for the service. There are three comfortable residences on the property. The grounds are tastefully laid out and shaded by fine old trees. The central building, opposite the head of the pier, is set apart as the administration building, and also contains accommodations for the captain of the boat. The residences on either side are occupied by the deputy quarantine physicians. There are also three good barns and stables on the place. By the courtesy of the Maritime Exchange, telegraphic communication with the city office in Philadelphia is maintained during the day through the exchange station immediately adjoining. During the night the general office is at Linwood. In removing the new station, and resigning its function as a quarantine of detention, many of the old rules and regulations for the government of the Board and of the station became obsolete. The Board has, therefore, deemed it wise to revise them and harmonize them with the present conditions.

BOOK NOTICES.

Leprosy and the Charity of the Church. By Rev. L. W. MULHANE. 12mo, cloth, pp. 155. New York and Chicago: D. H. McBride & Co. 1897.

This little book is a compilation of facts, showing the heroic work of charity accomplished by the sons and daughters of the Holy Church who are engaged in the care of lepers in various parts of the world, from Canada to the islands of the Pacific, and from Iceland to the regions of India.

The reverend author mentions the cases reported by Dr. McDougal in this JOURNAL, Feb. 3, 1895, and quotes the opinion of Dr. A. W. Hitt of Louisville that the cases were genuine leprosy. He sounds a note of warning about the increase of leprosy in this country, and makes some practical suggestions regarding the exclusion of persons affected with this disease.

The editor of this JOURNAL, Dr. Hamilton, when supervising Surgeon-General, issued a circular which was approved by the President of the United States, which forbade the entry of any vessel into any port of the United States until the master of the vessel filed a declaration that there was no leper on board the vessel. This declaration was a part of the ship's papers. A suggestion was also made by Dr. Hamilton in his report looking to the segregation of all lepers in the United States, but the weakness or incompetence of his successor has prevented the fulfillment of the suggestion. The State authorities and the church must do the work unless the Government takes hold of it.

The Sequels of Disease. BEING THE LUMLEIAN LECTURES DELIVERED IN THE ROYAL COLLEGE OF PHYSICIANS, 1896, TOGETHER WITH OBSERVATIONS ON PROGNOSIS IN DISEASE. By Sir DYCE DUCKWORTH, M.D., LL.D. 8vo, cl., pp. 227. London, New York and Bombay: Longmans, Green & Co. 1896.

These lectures will be of substantial aid to those engaged in the study of prognostics and the sequels of disease. Their pleasant style and keen insight make them interesting, and their instructive character constitutes them contributions of real value to medical literature, useful alike to the practitioner and the examiner for life insurance. The work is not an exhaustive one, its size prevents that, but in typhoid fever and syphilis the sequelæ are fully mentioned. We regret that our limitations of space will not permit us to quote from the work *in extenso*, but we venture the assertion that few medical men, having once commenced its reading, will stop until they shall have finished.

Diseases of the Stomach. By MAX EINHORN, M.D. New York: William Wood & Company. 1896.

This work by Dr. Einhorn forms a valuable addition to the "Medical Practitioner's Library." Written by one who is thoroughly acquainted with the subject, it gives all the information regarding methods of examination, diagnosis and treatment, that can be gathered from the scattered literature of gastrology. The author does not appear to be an enthusiast, but is gifted with a goodly amount of common sense, enabling him to guide the beginner through the shoals of laboratory experimentation and fanciful therapeutics to the solid ground of practical utility. This book is a valuable handbook for reference regarding everything that is needed in the treatment of gastric diseases, presenting in a convenient form all the fruits of recent investigation in this important field of medical research.

The Diseases of Infancy and Childhood, FOR THE USE OF STUDENTS AND PRACTITIONERS OF MEDICINE. By L. EMMETT HOLT, A.M., M.D. With 204 illustrations, including seven colored plates. 8vo, cl., pp. 1117. New York: D. Appleton & Co. 1897.

In the last year we have had some notable works on diseases of children. The volume under consideration compares favorably with other recent works and in some respects it is in advance. The work is well illustrated and is very comprehensive from a medical standpoint, the strictly surgical topics in connection with pediatrics being omitted. The discussion of nutrition and foods is very complete.

The old-fashioned dosage by "apothecaries" weight, long since abandoned in the Pharmacopeia, mars an otherwise valuable work.

Swedish Movements or Medical Gymnastics. By Dr. T. J. HARTELIUS. Translated by A. B. OLSEN, M.D., with Introduction and Notes by J. H. Kellogg, M.D. 8vo, cl., pp. 162. Battle Creek, Mich.: Modern Medicine Publishing Co. 1896.

Dr. Hartelius is recognized as the leading authoriy on Swedish movements, and we have his certificate conspicuously printed to the effect that the translation correctly interprets his treatise, which was founded upon the principles of Ling's system.

The comments of the editor, Dr. Kellogg, are wise and judicious. The illustrations are clear and concise.

Artificial Anesthesia, A MANUAL OF ANESTHETIC AGENTS AND THEIR EMPLOYMENT IN THE TREATMENT OF DISEASE. By LAURENCE TURNBULL, M.D., Ph.G. Fourth edition, revised and enlarged. With Illustrations. 8vo, cl. Philadelphia: P. Blakiston, Son & Co. 1896. Price $2.50.

The three previous editions of this book were published in

1878, 1879 and 1889 respectively, and it will be seen that the work has steadily increased in bulk and amount of information.

The author is a firm and consistent advocate of ether as the safest systemic anesthetic. The book has been brought up to date and is one of the most valuable on the subject.

A Guide to the Clinical Examination of the Blood for Diagnostic Purposes. By RICHARD C. CABOT, M.D., with colored plates and engravings. 8vo, cl., pp. 405. New York: William Wood & Company. 1897.

This work, the first of its kind in America, shows the swing of the pendulum in the direction of the humoral pathology as modified by modern bacteriology. As a laboratory guide it will be of immense value, and to the painstaking clinician it will be a labor-saver. We predict a wide field of usefulness for the book, which is of interest to all practitioners. The illustrations are fine, although we must be permitted to doubt the necessity of going to Leipzig to have them made.

The Retrospect of Medicine, A Half Yearly Journal containing a retrospective view of every discovery and practical improvement in the medical sciences. Edited by James Braithwaite, M.D., Lond., assisted by E. F. Trevelyan, M.D., Lond., B.Sc., M.R.C.P. Volume cxiv, July to December, 1896. (Issued January, 1897.) London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. 12mo, cl., pp. 440.

This volume is fully up to the high standard of its predecessors and should find a place in libraries of those who desire a brief synopsis of current medical literature.

Transactions of the American Surgical Association. Volume XIV. Edited by De Forest Willard, A.M., M.D., Ph.D., Recorder of the Association. Printed for the Association. 8vo, cl., pp. 742. Philadelphia: William J. Dornan. 1896.

If the American Surgical Association had no other claim for existence than the publication of this volume, it would be a sufficient justification. We undertake to say that no previous volume surpasses it, nor do the published transactions of foreign surgical societies show any better work. It is true that the topics are different and that as a rule the light travels westward, and we are found discussing the topics which interested Europe a few years ago. We were wonderfully belated on the subject of tuberculosis (so were the English), but we have made up for it by the practical way in which the subject is now taken up. In a year or two we suppose we will see the wounds, injuries and diseases of the liver occupying the attention of the Association as it is now in France. However, we still adhere to our faith in American surgery, that it is the most practical and life-saving of any. The interesting address of Dr. Tiffany on Gasserian operations for trigeminal neuralgia gave rise to an interesting discussion. The mortality was 21 per cent. and the exact location of the lesion doubtful. Notwithstanding this fact, the opinion was marked in favor of operation after exhaustion of all proper therapeutic measures.

It is with some surprise that we read the discussion on trauma of the kidneys, and the unchallenged opinion that all cases of injury to the kidney followed by hematuria should be subjected to operation. In two cases under our personal observation recovery took place without unpleasant incident under rest and abdominal support with internal administration of opium and gallic acid. Neither case would have done better by operation. In penetrating wounds of the kidney the conditions are different, and there can be no question of the propriety of early operation. We have nothing but praise for the volume, which is in all respects creditable to American surgery.

Transactions of the American Orthopedic Association, Tenth Session held at Buffalo, N. Y., May 19, 20 and 21, 1896. Volume IX. 8vo, cl., pp. 276. Philadelphia: Published by the Association. 1896.

This book is one of the most attractive volumes published by the Society. Beside the papers and proceedings, it contains several excellent Roentgen ray plates exhibited by Dr. De Forest Willard. An interesting paper by Dr. Harry Sherman of San Francisco, on iodoformization of bones and joints in tuberculosis, led to an interesting discussion, the burden of which was to the effect that iodoform emulsion was negative in its results in these cases. One of the speakers with charming naïveté asserted that the standards of general surgeons were different from those of the orthopedic surgeons! As the dead and the absent are always wrong, the "orthopedic" surgeons had the best of it.

Transactions of the Medical Society of New Jersey, 1896. 8vo, cl., pp. 448. Newark, N. J.: L. J. Hardham. 1896.

This volume contains the papers read at the annual meeting of the Society, and also obituaries of the following: George Taylor Robinson, Emma W. Edwards, Charles F. J. Lehlbach, Luther F. Halsey, C. H. Dunham, W. W. I. Phillips, Alexander Betts, Levi D. W. Miller, Job Symes Crane, David H. Miller, J. J. Daly and Thomas L. Hough. The New Jersey brethern show by their admirable papers that they are *au courant* with the best medical thought of the time.

NECROLOGY.

H. R. KELLY, M.D., of Galion, Ohio, died Jan. 4, 1897, after an illness of only six days. He was 62 years of age. Dr. Kelly was born Feb. 7, 1835, in Shamokin Township, Northumberland County, Pa. He received his early education in the common schools until reaching the age of 13, serving then as a clerk in a store for two years. At the expiration of that time he began teaching school and continued until 1853, when he removed to Ohio. Upon arriving he settled in Perry Township, Morrow County, teaching school one year. In 1854 he became a student of the Ohio Wesleyan University at Delaware, pursuing his studies until 1856, when he went to Cincinnati, where he attended a course of medical lectures, after which he came to West Point, Morrow County, and engaged in the practice of medicine until 1865, when he went to Columbus and attended another course of lectures at Starling Medical College and graduated. He practiced medicine at West Point until 1870, when he removed to Galion. The deceased was married in 1858 to Miss Matilda Emma Keech of Chester County, Pa. One son survives, Webb J. Kelly, the well-known Secretary of the American Academy of Railway Surgeons. In addition to attending to a large practice Dr. Kelly has been foremost in many local affairs and has held a number of positions of honor and trust. He was a member of the Ohio State Medical Society and in 1878 was appointed a trustee of the Girls' Industrial Home at Delaware. For twelve years he was a member of the board of education. He was connected with the medical and surgical department of the Erie Railway for twenty-seven years and was the oldest surgeon on the road. He was a member of the Knights of Pythias, and its first representative to the grand lodge. With one exception he was the oldest Odd Fellow in Galion and was a Mason thirty-five years. He enjoyed a large practice and as a citizen he was most highly esteemed.

THOMAS T. JANEWAY, M.D., of New York city, a relative of Professor Edward Janeway, M.D., and son of Colonel John H. Janeway, the well-known army surgeon who was retired about four years ago, died January 15. He was born in Princeton, N. J., in 1860 and educated at Andover, Mass., until the time of taking up the study of medicine. His preceptor was the late Dr. Willard Parker, under whose guidance he graduated from the New York College of Physicians and Surgeons in 1883. He became associated with Dr. Daniel M. Stinson, the associate and son-in-law of Dr. Parker, and so continued until last year. He was a physician of wide reputation and was highly respected by members of the profession. His death took place in Bermuda, whither he had gone for a respite from overwork. Close application to work brought on a condition of ill health, and it was hoped a trip to Bermuda would set him on his feet again. He was accompanied by a friend and was expected back early in February. It is supposed heart disease caused his death. He leaves a widow.

GEORGE CONNER, M.D., of Cincinnati, aged 53 years, died at his old home, New Richmond, Ohio, January 12, after a brief illness. Dr. Conner had practiced medicine in Cincinnati

several years, having graduated at the Miami Medical College in 1872. He married Miss Elizabeth Archard, the well-known New York journalist.

SAMUEL H. CHARLTON, M.D., of Seymour, Ind., died January 12 in his 70th year. The Doctor held many prominent professional positions and was a member of the ninth international medical congress.

B. B. ADAMS, M.D., Washington, D. C., died suddenly January 25. He was a practitioner in the District for upward of twenty years.

ASSOCIATION NEWS.

Section on Ophthalmology.—Members of the AMERICAN MEDICAL ASSOCIATION interested in ophthalmic medicine or surgery, and desiring to read papers before the Ophthalmic Section at its next meeting in Philadelphia, June, 1897, are earnestly requested to forward not later than March 1, 1897, the titles of such papers either to Dr. G. E. de Schweinitz, Chairman, 1401 Locust St., Philadelphia, or to Dr. Horace M. Starkey, Secretary, 70 State St., Chicago. There is every indication that the meeting will attract a large attendance of American ophthalmologists, and those desiring to contribute to the scientific business of the meeting, and who have not yet indicated either to the President or to the Secretary the subject which they will present, are particularly invited to comply with the request contained in the above notice, as it will not be possible to keep open the list longer than March 1, 1897.

SOCIETY NEWS.

New York County Medical Association.—The annual election took place on the 18th ult., when Dr. J. E. Janvrin was elected president for a second term; Dr. J. B. White, vice-president and Drs. M. C. O'Brien and N. G. Bozeman as secretaries; Dr. J. H. Hinton, treasurer; Dr. N. J. Hepburn, executive committee for four years. This, the largest local society of the country, has 977 active members on its list. In the year previous the total was higher yet, 1068.

New York State Medical Association.—The thirteenth annual meeting of the Fifth District Branch of the New York State Medical Association will be held in Brooklyn on Tuesday, May 25, 1897. All Fellows desiring to read papers will please notify E. H. Squibb, Secretary, P. O. Box 760, Brooklyn.

MISCELLANY.

Gift to the Institut Pasteur.—The Baroness de Hirsch has announced her intention of bestowing two million francs upon this institution, as a memorial to her late husband.

Vicarious Renown.—The Health Commissioner of Chicago, Mr. Wm. R. Kerr, is now engaged in booming himself for Mayor of the city, on the strength of the excellent sanitary work performed by that well-trained sanitarian, Dr. Frank W. Reilly, the Assistant Commissioner of Health.

Chloroformed Bromoform.—The alcohol solution of bromoform mixes readily with water if chloroform is added to it as follows: bromoform, 1.20; chloroform, 0.80; rum, q.s. to make 120 c.c. One teaspoonful contains 0.05 bromoform and 0.33 chloroform. —*Jour. de Méd. de Paris*, January 3.

Dr. Edward Kershner.—Dr. Edward Kershner, late of the Navy, has received the important appointment of Chief Physician at the Randall's Island Hospitals, New York, going on duty there on January 4. This item of news will be gratifying to many who watched the fight put up by Dr. Kershner on behalf of what he believed to be a sanitary principle against his sanitarily ignorant superiors of the "line." His friends will congratulate him that now he has nothing more malignant than the ward-heeler to fight against for the maintenance of his position.

Stepdaughter Entitled to Compensation as Nurse.—The stepdaughter is not bound, by the ties of consanguinity, to render her stepfather gratuitous services as a nurse and attendant during illness and decrepitude; but for such services, the supreme court of Louisiana holds, Succession of Stuart, Nov. 16, 1896, she is entitled to compensation.

Values a Laborer's Leg at $15,000.—The appellate division of the supreme court of New York holds, in Tully v. New York and Texas Steamship Company, Dec. 1, 1896, that $25,000 is too much to allow for the loss of a leg to a person 28 years of age, presumably in good health and strong, but who had no established business, and earned about $12 a week at such employment as he could obtain; yet it holds that $15,000 would not be out of the way.

International Honors.—The Emperor of Germany has conferred the decoration of the Kronen Orden of the second class upon Professor Roux of the Paris Institut Pasteur, and the French Republic has inscribed the names of Behring and Löffler upon the roll of the Legion of Honor. The Royal Society of London has also bestowed medals on Roentgen and Gegenbaur the anatomist (Heidelberg), and the Humphrey Davy gold medal upon Moissan of Paris, distinguished for his chemic researches.

Kinetographic Photography of the Heart.—Lechner's kinetograph allows twenty-five, thirty or more photographs to be taken in the course of a second, and is of great assistance in studying the activity of the heart. Braun has been using it to photograph the movements of the heart of a dog that was still continuing its beating. They were reproduced with absolute fidelity, and when enlarged showed certain details in the cardiac transformations that have always escaped the eye on account of the rapidity of the movements.—*Bulletin Méd.*, December 20.

Bellevue Hospital Medical College.—On January 20 this institution suffered a considerable loss by fire, which is believed to have originated from a defective electric lighting wire. The upper floor, containing the dissecting room, was entirely burned out and the lower floors were badly damaged by water. The laboratories were not seriously injured and the college records were for the most part spared. No serious interruption in the lecture courses has resulted from the conflagration, the rooms of the Carnegie laboratory and the Bellevue amphitheater having been put to use by the lecturing faculty.

The Obstetric Staff of the Health Department of Chicago met at the Auditorium Nov. 21, 1896. This staff, with Dr. Charles S. Bacon as president, is composed of physicians residing in the various quarters of the city and represents practitioners from the regular, homeopathic and eclectic schools. The object of this staff is to aid regularly licensed midwives in cases of difficult labor, to compel the registration of all midwives and to assist in the prosecution of those occupied in illegal practices. The staff holds meetings on the second Saturday of alternate months for the purpose of discussing the progress of the work and the reported cases. The registrar will record and tabulate all cases reported to him.

The Lee-Metford Bullet.—It is pretty well known that the troops in the Chitral campaign were not altogether satisfied with the "stopping power" of the Lee-Metford bullet. This has led to a number of experiments and a new bullet has now been devised in India for the Lee-Metford rifle which is stated to be admirably adapted to its purpose. Experimental trials have been made with it on an extensive scale at Meerut and elsewhere in the presence of a large number of officers, troops and medical officers, with most satisfactory results. The new bullet, while requiring no increase of caliber in the rifle or alteration in the charge of powder, retains the present range

and makes excellent shooting and inflicts the desired "stopping wound." It is the invention of Capt. Bertie-Clay, R. A., superintendent of the Dum Dum ammunition factory. Colonel Hill, in the course of a lecture to the troops at Meerut, said as the result of his personal experience that the Lee-Metford rifle with the new bullet was the most perfect weapon in existence. —London *Lancet*, December 26.

Nitrogen Monoxid in Obstetric Anesthesia.—The expense of the apparatus required to generate nitrogen monoxid has prevented its general adoption. But A. N. Rakhmanov recommends it in high terms in consequence of his experience with it in thirteen cases. The pains were absolutely abolished; the contractions of the uterus were normal and much more regular than before its administration, while there were no accidents for either mother or child. He urges the installation of the necessary apparatus in every large maternity institution, as nitrogen monoxid is the most anodyne and the easiest to manage of all our anesthetics.—*Bulletin Médical*, January 6.

Ranvier's Theory of Cicatrization.—Some recent experiments on rabbits have confirmed Professor Ranvier's assertion a while ago, that the union of wounds is not due necessarily to a multiplication, a proliferation of the epithelial cells, but to the fact that they become hypertrophied and slide down into the V-shaped space left by the incision, and in this way the union of the two edges of the wound is effected. Incisions in the cornea of rabbits show the process in the most interesting manner, and owing to its simple structure the various steps in the process can be watched and closely followed. As he remarks, the deeper cells of the corneal epithelium are like soft elastic balls compressed in a sack. If the wall of the sack is cut open at any point the balls will escape. When an incision is made into the epithelium of the cornea the cells are at first pushed back by the entering knife and then slip back again into their places, seeking the lower level until the wound is entirely closed by them, while the adjacent tissue is correspondingly depleted. They frequently show a number of nuclei in the course of twenty-four hours. The *Bulletin Méd.* of January 6 contains a detailed description of these interesting experiments.

Study of the Renal Circulation with the Roentgen Ray.—By injecting preparations with metallic substances the circulation can be studied with cathode photography to an extent and with a precision never before attained. If the photographs are then mounted to examine through the stereoscope, wonderful exactness can be secured. Poncet and Destots of Lyons announce the following results of their study of the renal circulation in this way: 1. The arterial circulation of the kidney is lobar and terminal. It divides the kidney into an independent anterior and posterior kidney. The one exception is the artery of the superior lobe which sometimes divides into two branches, so that in injecting it the whole of the upper end of the kidney is injected. 2. The intra-pyramidal artery divides by false dichotomy at the level of the cortical substance, but it does not anastomose with the collateral; there are no true arterial arcades. 3. A multitude of capillaries issue directly from the arteries and proceed to the glomeruli without passing through the multiple intermediaries. In incomplete injections the capillaries are seen emerging directly from the arteries, like needles on a pine bough or hoar frost on a branch. 4. The pyramidal arteries proceed from the glomeruli. 5. The veins anastomose readily so that the entire kidney can be injected through one single small vessel.—*Bulletin de l'Acad. de Méd.*, December 29.

The Mussulman Member of Parliament in France.—It seems that the new member from Franche Comté is not only a devoted Mussulman, but a popular and skilful physician, Dr. Grenier. Interviewed for the press he declares that he is charged with a prophetic mission, and hopes to see converts to his faith. The *Journal de Méd. de Paris* asks: Why not? The two principal features in which Mohammedanism differs from other religions are polygamy and the daily ablutions. It remarks that these would not be bad innovations in France. Polygamy would increase the birthrate, while rendering many people happy and reducing the number of old maids, and if every Frenchman were obliged to wash his face and feet morning and night, there would be a transformation, a regenerescence of the race, and Dr. Grenier would have accomplished more for hygiene than all the rest of the scientists.

Non-expert Can Testify as to Existence of Hymen.—The objection was made, in a prosecution for an attempt to commit rape, that a female witness who was asked as to whether, when she made an examination of the child on the Friday after the offense was alleged to have been committed, there was any hymen there, was not competent to testify in relation to a matter of this kind; that it was a matter connected with the anatomy of a human being and that, to be competent, a witness should possess the same intelligence and knowledge that a physician or professor of anatomy does. The witness testified that she thought she knew what the hymen was and that, if it was what she thought it to be, it was not there. The overruling of the objection, the supreme court of California holds, in People v. Barney, Oct. 20, 1896, was not error. Certainly, it says, it can not be necessary that a witness should be a physician or a skilled physiologist in order to be competent to testify as to the existence or non-existence of any part of the human body, when the matter can be determined by ocular inspection.

Cincinnati.

DR. CHARLES A. L. REED has opened an office at No. 32 Garfield Place.

DR. GILES S. MITCHELL has been appointed gynecologist to St. Mary's Hospital, to succeed Dr. George E. Jones.

THE SUIT for $25,000 against Dr. George H. Goode for malpractice has been decided in favor of Dr. Goode in the United States Court of Appeals.

A MAN appeared at the City Hospital last week with the following conditions: A silver plate 4 x 6 inches in the occipital bone, phlegmasia alba dolens, knee cap dislocated to posterior surface of leg, five ribs resected, his heart on the right side and a bullet in his pectoral muscle. These were all chronic conditions of several years' standing.

DR. G. I. CULLEN has been appointed on the surgical staff of the M. & C. Railway.

Philadelphia.

A STRONG SENTIMENT is abroad in the community in favor of increased accommodations for the insane and especially for the treatment of the criminal insane. By order of the court all of the insane convicts in the Eastern Penitentiary have recently been removed to the State Hospital at Norristown, where, by the way, one of them has since died under circumstances pointing to brutal treatment by the attendants, the case being now under investigation by the trustees. It is mentioned because it affords apparent support to the claim made by the prison authorities that the insane convicts could be treated as well in the prison as in the hospital. Judge James Gay Gordon, who has especially interested himself in this matter, appointed a commission consisting of Drs. S. Weir Mitchell, Thomas G. Morton, Charles K. Mills, F. B. Janney, and Assistant District Attorney Thomas W. Barlow to examine the insane prisoners at the penitentiary and the commission unanimously favored their removal to the hospital. On January 23 Judge Gordon and a party of invited guests paid a visit to the institution for the criminal insane at Matteawan, N. Y., under the charge of Dr. Alison. Their impressions were very favorable. It is thought that a strong appeal will be made to the legislature to make an appropriation for an institution of this character in Pennsylvania, as, indeed, has been recommended by Governor Hastings in his annual message.

THE SUPERIOR COURT has decided that the drug store act of 1887 as amended by act of 1891 is unconstitutional and reversed the judgment of quarter sessions court of Philadelphia in a case where a man was convicted of carrying on the business of an apothecary without being registered or having a certificate from the State Pharmaceutical Examining Board. The defendant owned several drug stores in Philadelphia, employ-

ing qualified assistants to carry them on. Personally he neither filled prescriptions nor sold drugs. Judge Reeder of the superior court gave his opinion that the law referred to came under the head of "objectionable class legislation" and declared it unconstitutional on this account. The act of 1891, amending the first section of the act of 1887, prohibits unqualified persons from engaging in the business of retailing drugs, etc., and provides a penalty for its violation which the section amended did not provide, and the amending act also excepted the "widow or legal representative of a deceased person who was a manager or registered pharmacist" from the provisions of the act, and declared it to be lawful for such person to carry on the business of such deceased persons, provided that the actual retailing, etc., "be done only by an assistant, qualified and registered" as required by the act. The reversal of the lower court is based on the ground that this is unconstitutional class legislation.

IT IS HOPED that a pay hospital for contagious diseases will soon be opened in this city. The Women's Health Protection Association in conjunction with the County Medical Society recently gave an entertainment in aid of this object, consisting of a concert, progressive euchre and dance at the Academy of Fine Arts, January 7, and realized a handsome sum. Twenty-three hundred dollars were subscribed previously, as a nucleus of the fund, by the Woman's Edition of the Press.

AN ANNEX to the diphtheria pavilion and an administration building for the Municipal Hospital have just been completed. The new pavilion contains two wards, each 40 feet long and 25 feet wide, and four private rooms, two of which are 13 by 13 feet, located at the west end and separated from the wards by a vestibule which opens upon a large porch, 25 feet long, enclosed in glass, which may be removed in the summer season. On the east end of the new pavilion is a porch and corridor 9 feet wide and 38½ feet long connecting the pavilion with the administration building, which separates the large and small pavilions. The space between each pavilion and the administration building is twelve feet in length and nine feet in width—all enclosed in glass, which may be removed during the summer season. The new pavilion is supplied with fresh air drawn from a stack some fifty feet from the building and conveyed under the ground through a tunnel to a chamber, where it is heated by steam coils and then propelled by a fan into the wards and private rooms. The foul air is driven out of the apartments by a fan drawn by an electric motor.

Washington.

TO SELL MEDICINES TO SOLDIERS.—The Vice-President has laid before the Senate a communication from the Secretary of War transmitting a letter from General Miles, president of the Board of Commissioners of the Soldiers' Home in the District of Columbia, recommending that Congress authorize the medical department of the United States army to sell medicines and hospital supplies at cost price to the Soldiers' Home in the District of Columbia. General Miles says that as the medical department of the army does not pay any internal revenue tax on whisky and alcohol, it can furnish these articles to the Soldiers' Home at a much less price than that for which they can be purchased of private parties. The law does not permit the medical department to sell these articles to the Soldiers' Home, and Congress is asked to enact legislation necessary to permit it to do so.

HOSPITAL INCORPORATED.—Articles incorporating the Episcopal Eye, Ear and Throat Hospital were filed January 26, by Bishop Satterly, Thomas H. Looker, Redford W. Walker, Gilbert M. Husted, A. D. Van der Veer and Susan Ladd Johnston. The free treatment of all diseases of the eye, ear and throat is the purpose of the institution. The consulting physicians are Drs. W. W. Johnston, J. Taber Johnson, J. W. Bayne, J. Ford Thompson, S. C. Busey, and N. S. Lincoln. The attending physicians were named as follows: Drs. T. M. Murray, J. H. Bryan, E. O. Belt, Frank Hyatt, W. H. Wilmer and W. H. Fox.

A MEDICAL APPOINTMENT.—Dr. B. F. McGrath, formerly resident physician at the Central Dispensary and Emergency Hospital, has resigned from the resident staff of the Home for Incurables and been appointed by the directors a member of the House Staff of Columbia Hospital for Women.

THREE IMPORTANT MEDICAL BILLS PASS THE HOUSE.—Three bills effecting the sanitary condition of the District passed the House on January 25: A bill for the regulation of cemeteries and the disposal of dead bodies; a bill to regulate privies, and a bill to prevent the spread of contagious diseases in the District of Columbia.

A HOSPITAL FOR CONTAGIOUS DISEASES NECESSARY.—There is the greatest necessity for Congress to act promptly and provide a hospital for the care of contagious diseases prevailing in the District. Hardly a day or week passes that some unfortunate person suffering with diphtheria or scarlet fever is not going the rounds, to the different hospitals, seeking admission and being invariably turned away because of its absence of proper facilities for their care. The recent legislation regulating contagious diseases will help reduce the number of such cases, but Washington will never be a modern city until Congress appreciates the serious situation and protects themselves and our citizens by providing a suitable hospital for the care and isolation of contagious diseases.

TWO SCIENTIFIC POSITIONS VACANT.—The Civil Service Commission will hold examinations in this and other large cities where there are applicants, on February 20, for the purpose of securing eligibles for the positions of preparator of specimens and assistant biologist, Department of Agriculture.

THE PUBLIC SERVICE.

Army Changes. Official List of changes in the stations and duties of officers serving in the Medical Department, U. S. Army, from Jan. 23 to 29, 1897.

Major Philip F. Harvey, Surgeon U. S. A., is granted leave of absence for two months, to take effect on or about Jan. 18, 1897. By direction of the Secretary of War.

Capt. William O. Owen, Asst. Surgeon (Ft. Bayard, N. Mex.), is granted leave of absence for one month, to take effect about the 1st proximo.

Major Clarence Ewen, Surgeon, having served over thirty years in the Army, is on his own application, by direction of the President, retired from active service this date, Jan. 26, 1897.

Major James C. Merrill, Surgeon U. S. A., is granted leave of absence for one month.

Capt. Robert B. Benham, Asst. Surgeon U. S. A., retired from active service by reason of disability.

Capt. Eugene L. Swift, Asst. Surgeon U. S. A., has been granted further extension of sick leave of absence of two months.

Change of Address.

Boyer, E. N., from 808 Jersey St. to Franklin House, Quincy, Ill.

Binkley, J. T., from Columbus Memorial Bldg. to 492 49th St., Chicago, Ill.

Barrett, E. J., from 12 Harrison St. to Palmer House, Chicago, Ill.

Beebe, Brooks F., 117 E. 4th St. Cincinnati.

Chaapel, V. P., from Irvona to Newberry, Pa.; Cross, G. D., from Philadelphia to 618 Edgemont Av., Chester, Pa.

Jones, George E., from Cincinnati, Ohio, to Connersville, Ind.

Johnson, C. W., from St. Louis, Mo., to Litchfield, Ill.

McBride, J. H., from Wauwatosa, Wis., to 1761 Q St., N. W., Washington, D. C.; Murdock, E. P., from 571 W. Adams St. to 601 Washington Boul., Chicago.

Ramsey, R. T., from London to Danville, Ky.; Rigdon, R. L., from Market and 3rd Sts. to 1615 Brodrick St., San Francisco, Cal.

Silver, H. M., from 39 7th St. to 5 E. 43rd St., New York, N. Y.

Wood, E. S., from Fairmount to 524 Michigan Av., Leavenworth, Kan.

LETTERS RECEIVED.

Ayres, S. C., Cincinnati, Ohio; Allison, B. A., Decatur, Ill.; Atkinson, W. B., Philadelphia, Pa.; American Sports Publishing Co., New York, N. Y.; Appel, A. H., Fort Porter, Buffalo, N. Y.; Alma Sanitarium Co., Alma, Mich; Adams, J. O., Washington, D. C.

Boehringer, C. F., & Soehne, New York, N. Y.; Biddle, James G., Philadelphia, Pa.; Burr, C. B., Flint, Mich.; Betz, Frank S., Kelly & Co., Chicago, Ill,; Baker, Henry B., Lansing, Mich.; Belch, T. J., Port Carbon, Pa.

Carter, J. M. G., Waukegan, Ill.; Coe, Henry W., Portland, Ore.; Colburn, I. L., Richland Center, Wis.; Casselberry, W. E., Chicago, Ill.; Chambers, J. H., & Co., St. Louis, Mo.; Cox, A. E., Milan, Tenn.; Columbus Phaeton Co., Columbus, Ohio.

Daland, Judson, Philadelphia, Pa.; Douglass, J. C., Franklin, Ky.

Ewing, Fayette C., St. Louis, Mo.

Felton, Howard E., Cartersville, Ga.; Fassett, Charles Wood, St. Joseph, Mo.

Graves, Marion L., Waco, Texas; Green, H. L., (2) Mt. Pleasant, Iowa; Gibson, Frank, Pittsburg, Pa.; Gardner, R. W., New York, N.Y.; Guild, C. H., Company, Boston, Mass.

Hektoen, L., Chicago, Ill.; Hummel, A. L., Adv. Agency, New York, N.Y.; Haldenstein, I., New York, N.Y.; Helfman, Joseph, Detroit, Mich.

Jenkins, R. B., Hogansville, Ga.; Jackson, Edward, Philadelphia, Pa. Jay, E. W., St. Anthony, Iowa.

Koehler, F. W., Louisville, Ky.; Kegan, Paul, Trench, Trübner & Co., Ltd., London, Eng.

Little, C. H., Piqua, Ohio; Love, I. N., St. Louis, Mo.; Louisville Sanatorium, Louisville, Ky.

Mountain Valley Springs Co., Hot Springs, Ark.; Modern Medicine Publishing Co., Battle Creek, Mich.; Morgenthau, Geo., Chicago.

Nutten, W. F., Newark, N. Y.

Perry, J. C., Portland, Ore.; Pilcher, James E., Columbus, Ohio; Pearse, H. E., Kansas City, Mo.; Putnam, B. H., North East, Pa.; Procter & Collier Co., Chicago, Ill; Pugh, F. H., Bryan, Ohio.

Reder, H., Aurora, Ill.; Randall, F. D., Malden, Mass.; Robbins, C. P., Winona, Minn.

Spencer, George A., Haverhill, Mass.; Squibb, E. H., Brooklyn, N. Y.; Seibert, W. H., Steelton, Pa.; Sullivan, G. M., Labelle, Mo.; De Schweinitz, G. E., Philadelphia, Pa.; Snyder, H. L., Old Zionsville, Pa.; Shotwell, A. N., Mt. Clemens, Mich.; Spiller, W. G., Philadelphia, Pa.; Smith, H. M., East Las Vegas, N.M.

Ten Broeck, W. H., Paris, Ill.; Tinsley, G. S., Wrightsville, Pa.

Wingate, U. O. B., Milwaukee, Wis.; Wilbur, Cressy L., (2) Lansing, Mich.; White Rock Mineral Spring Co., Waukesha, Wis.; Warner, W. R., & Co., Philadelphia, Pa.; Wagner, Carl, Chicago, Ill.; Weaver, W. G., Wilkes Barre, Pa.; Williams, C. C., Brighton, Mass.; Wells, W. A., Washington, D.C.

Young, Arthur, Prescott, Wis.